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REG. U. S. PAT. OFF.

VOLUME 125, No. 11 SEPTEMBER 11, 1947

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DOWNINGTOWN

Designers & Builders
Paper Making Machinery

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CALENDAR OF COMING EVENTS

September 25-26, 1947—TAPPI Plastics Meeting, New State College of Forestry, Syracuse, N. Y.

October 4-6, 1947—National Association of Waste Material Dealers, Inc. Fall Convention, Hotel Ritz-Carlton, Atlantic City, N. J.

October 9-11, 1947—TAPPI Alkaline Pulping and Chemical Products Meeting, Asheville, N. C.

October 23-24, 1947—TAPPI Fibrous Agricultural Residues Meeting, Alton, Ill.

October 27-29, 1947—The National Paper Trade Association of the U. S., Inc., Semi-annual Convention. Hotel Sherman, Chicago.

November 3-5, 1947—TAPPI Second Engineering Conference, Philadelphia, Pa.

May 18-20, 1948—American Pulp and Paper Mill Superintendents Association, Annual Meeting, Roosevelt Hotel, New Orleans, La.

Take a WALWORTH No. 225P Bronze Valve Apart...

COMPARE IT PIECE BY PIECE

It will pay you to look inside the Walworth No. 225P. Compare the improved design, construction and convenience features shown in the "exploded" view. Notice the husky bronze body, the removable seat and disc, the oversize stem, all assuring maximum protection against wear and leakage.

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DISTRIBUTORS IN PRINCIPAL CENTERS THROUGHOUT THE WORLD

Paper TRADE JOURNAL

VOL. 125, NO. 11 REG. U.S. PAT. OFF. SEPTEMBER 11, 1947

Aries Finds Demand For "Know-How" Grows

"American engineering know-how is playing a decisive role in the resurrection of business abroad and in the rise or modernization of industry in the rest of the world," declared Dr. Robert S. Aries, New York consulting engineer, this week. Dr. Aries, who just returned from an extended business trip to England and continental Europe, said that "American experts are hard at work in all these countries, putting up plants which will help build a two-way trade with the United States."

"American technical knowledge has become in itself a leading export item," said Dr. Aries, "and may now exceed half a billion dollars a year.

"Exports of American technique almost always go hand in hand with exports of U.S. materials and equipment," declared Dr. Aries, and the "know-how" is a good salesman for U.S. business. It should bring continuous and recurring shipments of American products, spare parts, replacements, and additional equipment for expansion of the projects."

"Foreign firms have a high regard for American technology and are avid for economic and engineering surveys, licensing of patents and processes, sale of blueprints or (if they can afford it) shipment of tailored plants. A big 'export' item is that of technicians and experts to install and start the plants."

Dr. Aries, who, in addition to being a consultant for many leading American and foreign firms in the chemical, pulp and related fields, is a research Associate at the Polytechnic Institute of Brooklyn, N. Y., and director of the Northeastern Wood Utilization Council, said that a considerable share of know-how exports is going to modernize and repair the industries in Europe crippled equally by neglect and destruction. His engineering firm, which also has offices in London, Paris, and Zurich, has specialized on exchanging technical information with foreign firms under license agreements.

"World demand for American know-how is almost insatiable because foreign countries regard our methods as the most advanced. Chemical engineering, particularly appears to be far ahead in this country. While the export peak in general has already passed, the 'export' of technical know-how should be expected to continue at its present high level," concluded Dr. Aries.

Canada Examines Effect of Dollar-Saving on Exports

Dr. Robert S. Aries
Finds Export Market for Technology

TORONTO — Notwithstanding the cutback of 50,000 tons of newsprint ordered by the United Kingdom in its purchases from Canada for the last six months of the current year, shipments from Canada to the United Kingdom during that period are likely to be twice as high as for the first six months of the year. That is because the contract for 1947 called for 150,000 tons, while exports of newsprint to the U. K. to the end of June were 22.6 percent below the comparable figures for 1946, and amounted to 34,068 tons, approximately half of which (17,089 short tons) went overseas in the month of June. Assuming that the July and August figures were no higher than those for June, it would appear that something over 68,000 tons have been shipped to the U. K. during the first eight months of the year, leaving around 32,000 still to go forward, after allowing for the 50,000 cut, or approximately 8,000 tons a month to the end of the year from Sept. 1.

Total overseas newsprint exports in June were up 31.7 percent, while shipments to the United States were up 11.8 percent, according to figures made available by the Newsprint Association of Canada and compiled from reports of Dominion Bureau of Statistics. For the six months ending with June, overseas exports were up 4.8 percent and shipments to the United States 14.5 percent.

Shipments to Australia were the largest overseas in the first half with 75,145 tons. This is 36.4 percent over the comparable 1946 figure and more than double the amount shipped to the United Kingdom.

However, other dollar countries are also compelled to restrict imports and Australia has curtailed her imports of newsprint from Canada by 30 percent and a government spokesman declares that the cuts already made in Australian dollar expenditures are "only a beginning."

In Canadian newsprint circles the main result of the cut in newsprint imports by Australia will be reallocation of supplies to other purchasers, where demand is greater than supplies, according to reliable sources.

In the meantime, interest is develop-

(Continued on page 20)

Hollingsworth & Whitney Increasing Capacity

WINSLOW, Me. — The Rust Engineering Company is presently engaged in the construction of additional facilities for the Hollingsworth & Whitney Company at its Winslow mills. Bleach plant additions are increasing the present 50 ton per day, 2-stage batch process to a 130 ton per day, continuous 3-stage system by the installation of a separate caustic stage, three additional hypochlorite bleachers, and reconstruction of the present chlorination stage.

Slushing system additions will provide three 100 ton concrete, tile-lined, stock storage tanks for storage of bleached and unbleached pulp at 12 to 15 percent density, and one blending tank of the same design for the blending of pulp before bleaching, together with facilities for pumping slushed stock between the pulp and the paper mills.

Sales Records Win Scott Promotions

PHILADELPHIA — A series of important moves, affecting members of the retail sales organization of the Scott Paper Company have been announced by retail sales manager, D. A. Prouty. Chief among the changes in responsibilities is the appointment of Bill Draper, Pittsburgh divisional manager, as manager of the larger Chicago division, and Adin Fox, Philadelphia district manager, to the new Pittsburgh divisional manager.

Three district managers have been given increased responsibilities in new territories. Fred Brunk comes in from Kansas City as Philadelphia district manager. Jamie Phillips leaves Birmingham for Dallas as district manager. Phil Murray moves from Dayton to Buffalo as district manager.

The announcement includes the promotion of four men to positions of district managers in the retail field. Jim Merriman, distribution research and development department, goes to Kansas City as district manager. John Carroll, Buffalo salesman, has been made Nashville-Knoxville district manager, and Doug Fish, Brooklyn salesman, becomes Dayton district manager.

Bill Draper has been Pittsburgh divisional manager since November, 1944, following his return from the service. His current move takes him to the Chicago market, one of the largest in the country.

With his Scott career beginning in 1932, Draper first worked in the New York area as a retail salesman. He went to Boston the following year. From there he moved to Albany as district manager and then to Springfield in the same capacity.

On January 1, 1937, Draper was promoted to the important post of New England divisional manager. He came to Chester five years later as chief sales correspondent. From this position he entered the Armed Forces.

Upon returning to the company, Draper became Pittsburgh divisional manager, establishing an enviable record. Known as a splendid leader, with aggressive drive and enthusiasm, Bill has justly earned his current move to Chicago.

Adam Fox, who has been Philadelphia district manager for the past year and a half, well deserves his promotion to Pittsburgh as divisional manager. His first association with the company was in 1936, as a retail salesman in Philadelphia. From here he moved to Boston in the same capacity, becoming Binghamton district manager a short time later. His next assignment was in Buffalo during the fall of 1939. Fox entered the Army in September, 1942.

Returning to the business last year, Fox resumed the responsibilities as Philadelphia district manager. He has demonstrated outstanding ability in the training of new men, has had unusual success with the presentation of the Scott store advisory service program before customer groups, and rapidly established a reputation for thoroughness and perseverance in multiple assignments.

Fred C. Brunk comes to Philadelphia as retail district manager. Engaged as a salesman in St. Louis seven years ago, Fred advanced rapidly and became Evansville district manager less than a year later. Subsequently, he took over the Memphis territory as district manager until entering the

(Continued on page 24)

Allen Heads Sales for United Paperboard Cartons

NEW YORK — Appointment of William H. Allen as sales manager for United Paperboard's Carton Division was disclosed this week by Harold W. Kephart, vice-president in charge of sales.

Mr. Allen's long and diversified experience in the folding carton field includes fourteen years with the Sutherland Paper Company and, more recently, three years with the Empire Box Corporation as a sales manager. He has patented several styles of cartons and has been instrumental in the development of frozen food packaging and the pre-packaging of fruits and vegetables in consumer size units.

A popular figure in the industry, he has a great many friends among carton users and paper distributors, particularly in the east and middle west.

Mr. Allen will have his headquarters in United Paperboard's general offices, 285 Madison Avenue, New York, N.Y.

Gordon Gill Talks on Supervisor's Status

KAUKAUNA, Wis. — Gordon P. Gill, industrial relations counselor of Appleton, addressed the Thilco Foremen's club in the Thilmany assembly room Monday afternoon, September 8, on "The Status of Supervisors Under the Taft-Hartley Law."

During the business meeting at 4:30 in the afternoon, several foremen discussed new manufacturing processes now in operation at the mill. Dinner was served in the Elks clubrooms at 6:30.

Bryan Named to Practitioners' Board

CHICAGO—John E. Bryan, Wisconsin Paper & Pulp Manufacturers Traffic Association, has been nominated for a directorship on the board of the Chicago Regional Chapter of the Association of Interstate Commerce Commission Practitioners. The election was held on Friday, September 5, at the annual meeting of the Association at which time William B. Browder, commerce attorney for the Illinois Central Railroad, spoke on "Recent Trends in Spotting Car cases."

National Blank Book Gives Out Promotions

HOLYOKE, Mass. — Joseph J. Macek of New York, supervisor of the office of the National Blank Book Company in that city, is being transferred to Holyoke. He will direct all office procedures of the main office here and of the several branch offices. He has been with National for the past 19 years.

Several other promotions have been announced by the company. William Lindenberger is being advanced to New York office manager. He has recently been manager of the New York office special order department.

John J. Ramma of Chicago has been promoted to Chicago metropolitan sales manager. He will supervise distribution in Chicago, Wisconsin, the upper peninsula of Michigan and northern Illinois.

Walter Waldvogel of Chicago is being transferred from the Chicago office of National, where he was a salesman, to the Pacific Coast.

Reed Ferguson of Chicago, a 12-year veteran with National, moves up from the special order desk at the Chicago office to sales representative for the city of Chicago.

Two new sales representatives have been added to National's force: Norman L. Hanson will be in Wisconsin, and John A. Hess will work out of the Chicago office.

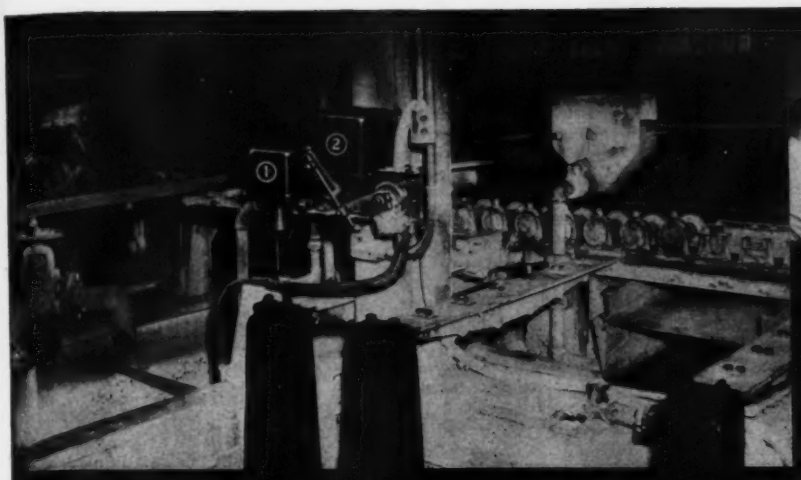
Connie Woelky Heads B-D Display Paper Sales

NEW YORK—Appointment of Connie Woelky as sales manager of Bulkley, Dunton's display paper division was made known this week by Harvey A. Brownell, vice-president. Active for over twenty years in the display field, Mr. Woelky brings a great wealth of practical experience to his new position.

He started his career in 1925 in Milwaukee with Ed Schuster, Inc. and the Boston Store, both department stores, and The Grand, a ladies specialty store. In 1935 he entered the chain store field with J. C. Penney Company of Milwaukee as display manager of that company's first large department store, and the following year was transferred to New York and put in charge of a display service for over 1,600 company stores throughout the country.

In 1938 he was invited by the Schulte Cigar chain to take charge of the company's merchandise presentation including the newly created men's furnishings division. In this capacity, he initiated and supervised all displays, point-of-sale fixtures, and other merchandising aids, heading up a department with a staff of 50 including a sign and carpenter shop.

From September 1946 until he became associated with Bulkley, Dunton & Co., he was with the A. S. Beck Shoe Company.



PART OF MICROMAX PH CONTROL INSTALLATION AT KALAMAZOO VEGETABLE PARCHMENT CO. (1) IS ELECTRODE ASSEMBLY. (2) IS ALUM VALVE DRIVE UNIT.

MICROMAX PH CONTROLLERS FOR 3 MACHINES, MOSINEE PAPER MILLS

FROM PAPER OR BOARD MACHINE TO LAB— THERE'S AN L&N INSTRUMENT FOR pH

Whatever the pH problem may be—automatic control of stock fed to the Fourdrinier or cylinder, spot checks in the mill, control lab tests—there's an L&N instrument for practically any measuring need.

For Automatic Control

Automatic Micromax pH Control is now spreading rapidly. In some cases it helps to improve the uniformity, texture or color or finished sheet: in others it increases wire life and often saves alum.

Engineering-wise, Micromax pH Control offers the great advantage of being designed as a complete system, with components specifically intended for each other and for the responsive, dependable Micromax Controller. This instrument can be either a strip-chart model, with a long, detailed record and the feature of automatically standardizing its measuring circuit; or a round-chart model, with an unusually readable scale and a 24-hour circular chart.

For Manual Checks

The man who is not a pH expert finds the Glass Electrode pH Indicator easy to use and thoroughly dependable. The operator simply pours pulp, bleach, white water or other sample into a beaker, then reads pH on the Indicator's scale. Hot, damp atmosphere, up to 95% humidity at 85 F doesn't affect accuracy.

For high-precision testing by trained technicians, the Universal pH Indicator reads pH directly with its own glass electrode or any other electrode —has an accuracy of ±0.05 pH.

If you have a pH measuring, recording or controlling problem, we suggest you call in an L&N engineer. Or, if you prefer, we'll send any of the following publications:

Portable Glass Electrode pH Indicator	Cat. E-96(2)
Micromax pH Recorders	Cat. N-96(1)
Paper Stock at Specified pH	Bul. N-96-709D

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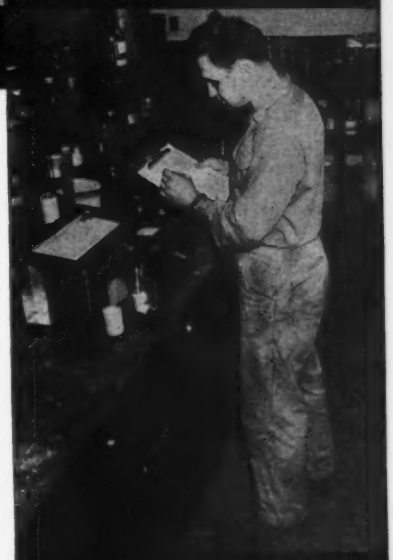
September 11, 1947



USING PORTABLE INDICATOR FOR LAB TESTS AT W. C. HAMILTON & SONS

ONE OF SORG PAPER CO.'S AUTOMATIC MICROMAX PH CONTROL PANELS

K.V.P. Starts Operation At Espanola Mill

PARCHMENT, Mich.—Ralph A. Hayward, President of Kalamazoo Vegetable Parchment company, recently witnessed the first production of paper in the K. V. P. subsidiary Canadian plant at Espanola, Ont. Originally it was planned to produce only sulphate pulp and kraft paper, but due to the shortage of newsprint the plant at Espanola is temporarily turning out this product. The Espanola plant was started when the war cut off pulp supplies for the K. V. P. Company.

In 1942 the Kalamazoo Vegetable Parchment Company purchased the Espanola property. This included the idle plant containing six newsprint machines, the town site which had been the home of more than 4,000 persons, dams and water power installations on the Vermillion river and cutting rights on thousands of acres of crown lands. They have a lease renewable on 6,500 square miles of land which contains spruce and balsam stands and also a heavy stand of jack pine. About ten years ago a six-stage bleaching process was perfected for use on woods of high resinous and pitch content. It brought jack pine into the picture as a source of pulp wood. This process called for a lot of chemicals, mainly chlorine and caustic. Making chlorine and caustic from salt solution called for a high output of electrical power. Espanola, with its sixty-four foot water head offered the needed power at low cost.

A 10,000 horsepower vertical generator driven by water power was installed. A huge electrolytic process was set up for making chlorine and caustic from a solution of common salt. The powerhouse was remodeled and power lines led from the generators into the mill by a highly flexible system of power distribution. Equipment for an entirely new pulp bleaching process was installed. All the machinery for making bleached, semi-bleached and unbleached sulphate pulp in a mill that had made only unbleached ground wood pulp, was set up. One installation was a 160-inch Kamyr pulp drying unit, the largest Kamyr ever built.

When the jack pine is broken down to get out the cellulose, it is found that lignin makes up about half the volume. This is drawn off along with the chemicals from the digester where the separation takes place, sent through the evaporators and then into the recovery furnace. Then the furnace is fired with the lignin that has been extracted from the wood and this supplies practically all the steam used in the mill. To make this whole scheme possible, it is necessary to purchase only about 350 cars of salt annually. Under this system of operation the supply of jack pine is inexhaustible. With the newly developed bleach they can turn out a white pulp that is equal to any and surpasses most pulp in whiteness.

Espanola was once deserted because the cost of transporting the timber to the central mill became too high in comparison to the price it would obtain in pulp form. K. V. P. officials are taking care to see that it is not once more abandoned, due this time to careless use of the natural resources in the area. To prevent any such danger they have brought the science of forestry conservation into full play. By staggering the areas to be logged and cutting only the large trees, they maintain a uniform supply of timber. They have estimated that in about sixty-five years the entire 6,500 square miles of land will have been cut over once and they will be ready to start over again. This assures them of the amount of lumber they are permitted to cut under their contract with the government and of a perpetual supply for their use.

The Espanola plant will turn out about 45 tons of newsprint, the same amount of kraft paper per day and about 200 tons of sulphate pulp in the same period. The use of the one machine on newsprint is merely a temporary emergency operation and is to be discontinued as soon as the newsprint situation eases. The two paper machines will then be used to make kraft paper for shipment to the Canadian converting mill in Hamilton, Ontario. This mill was purchased in 1945 and will convert paper made at Espanola for Canadian and export trade.

Wilson Opens Office as Industrial Consultant

BLOOMFIELD, N. J.—W. Hart Wilson, in charge of container development and industrial packing, Federal Telephone and Radio Corporation, Clifton, N. J., has opened industrial consultant offices at 79 Renner Ave., this city. Prominent in the fields of industrial packaging for export and domestic trade, materials handling and storage operations, Mr. Wilson has also authored technical articles and operational manuals.

His experience is wide and varied, beginning in the automotive industry in 1932. Mr. Wilson has been identified with many leading manufacturers in the capacity of packaging and materials handling specialist. From 1938 until the war he developed and installed materials handing methods and packaging operations in chain and department stores.

Walton Files to Repeat In Council Post

SPRINGFIELD, Mass.—Albert Walton, Jr., methods manager at Old Colony Envelope Co., in Westfield, and president of the Common Council, has filed his nomination papers for Republican party primaries as the Ward 4 representative in that board.

Walton, who has been methods manager at Old Colony for 17 years, is rounding out his fifth year in the common council.

The biennial primary balloting will be held next month.

St. Regis Gets Rights To Suwannee Forest

NEW YORK—The St. Regis Paper Company has acquired the right to manage and utilize 208,.000 acres of long leaf and slash pine in Georgia's Suwannee Forest. This tract, under management of the Superior Pine Products Company, has been recognized in the South as an outstanding example of the insurance of perpetual growth through forest management. The timber contract gives St. Regis the right to utilize for 60 years a growth estimated to be 150,000 cords annually. This will ultimately be used to supply pulpwood for the production of bleached and unbleached sulphate pulp from which will be made paper and paperboard for conversion into multiwall bags and other types of industrial packaging.

The Suwannee Forest is bounded on the east by the Suwannee River. The area is served by two railroads, the G. S. & F. and the A. L. L. The tracts are within 65 miles of shipside with favorable freight rates.

Those who manage Suwannee Forest live in it, and the forest now furnishes employment for 500 to 600 people. This is expected to develop to at least 1500. Annual growth of 150,000 cords of wood will supply pulpwood for 260 tons of pulp per day. Anticipated supply from privately owned timber farms in the adjacent territory will bring the production of bleached and unbleached sulphate pulp to 750 tons a day, or 250,000 tons a year. The conversion of this pulp into paper or board will mean steady employment for 2500 people. Ultimately, converting plants for multiwall bags and other packaging units, converting 250,000 tons of paper or paperboard, would mean the employment of an additional 3000 people.

Suwannee Forest is notable for the remarkable achievements in fire prevention that have been made there. They installed the first shortwave radio licensed by the Federal Government for private use in forestry. The mobile units they now use enable men and equipment to get under way at once to prevent the spread of small fires. The forest has 6,000 miles of fire breaks, 200 miles of roads and truck trails, four 100-foot steel lookout towers and 150 miles of company-owned telephone lines. Such practices have minimized fire loss to less than¼ of 1 per cent of the acreage.

Roy K. Ferguson, president of St. Regis, says the company will continue the excellent policies of the former management and will augment them with the best equipment and with the skills made available through forestry associations and research services. Management of the Suwannee Forest will be under the direction of James H. Allen, president of Florida Pulp and Paper Company and Alabama Pulp and Paper Company, affiliates of the St. Regis Paper Company.

QUICK AS A FLASH!

LIMITAMP CONTROL GIVES SURE, SHORT-CIRCUIT PROTECTION

In less than *one-quarter* cycle, EJ-2 fuses in Limitamp control can cut off a rise in current from a short, and clear it in one-half cycle—long before the short has time to harm the contactor or motor. Your plant's power system needs this prompt handling of fault currents, and you will avoid the risk of costly shutdowns that can result from one, mad short circuit.

A STARTER AND PROTECTOR IN ONE CABINET

G-E Limitamp control consists of an airbreak contactor (the motor starter), and EJ-2 fuses (the short-circuit device). They are mounted in separate compartments of one, all-steel cabinet.

Airbreak contactors are specially designed for hard duty. Operating experience has proved they furnish reliable, low-cost service with only routine maintenance.

Because they operate in air, they eliminate the problem of handling oil. And tip life of airbreak contactors is many times that of comparable oil-immersed tips.

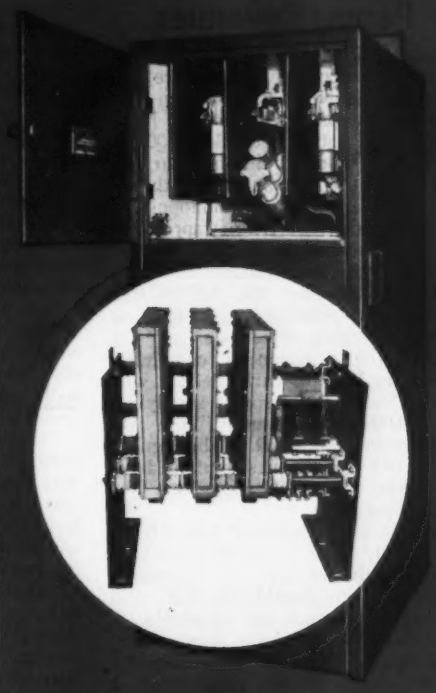
You can depend on EJ-2 fuses for sure, short-circuit protection. They are "fail-safe" devices. There is nothing about them to wear. They are easy to replace.

OVERLOAD AND UNDERVOLTAGE PROTECTION

Isothermic overload relays, accurately calibrated against actual motor characteristics, guard the motor against overheating from sustained loads or single phasing.

FACTORY-ASSEMBLED CONTROL

Factory-assembled in one cabinet, Limitamp is easy to install, easy to co-ordinate with other control, saves space, and improves the appearance of your plant.



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General Electric Company, Section D676-250
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Please send me Bulletin GEA-4247 on Limitamp control.

Name.....

Company.....

Address.....

FINANCE

South Takes Census Of Paper Revenues

ATLANTA, Ga.—A survey by the Associated Press correspondent here reveals that since 1932 businessmen and Southern newspaper publishers have turned an investment of $100,000 in research into a multimillion-dollar industry presenting a competitive threat to the Canadian newsprint monopoly.

"Already this Southern newsprint industry, which produces paper from the prolific southern pine, reckons its operations at well over the $25,000,000 mark," it was pointed out, "and it is now proceeding to triple its size.

"When the program is completed sometime in 1948, or early 1949, it will give the South a newsprint supply of some 200,000 tons annually," the AP correspondent continued. "The significance of the supply was explained by the Lufkin (Tex.) News, which observed editorially:

"Two hundred thousand tons of paper will only begin to supply the needs of the South; in fact, the increased capacity of the Southland Mills will just begin to meet the demands of Texas newspapers alone, but a perpetual suppl of 200,000 tons annually assures southern newspapers of a source in part of their needs. What is more important it furnishes a large enough supply to break the Canadian monopoly."

The Southland Mills mentioned in the editorial is the only plant in the South now producing newsprint from southern pine, but a group of Alabama businessmen and publishers recently formed a second company to undertake a similar operation. Southland, incidentally, is located at Lufkin.

The AP correspondent went on to say that the Alabama enterprise was organized only recently and plans to spend $30,000,000 on a newsprint plant to be located on the site of the wartime Alabama Ordnance Works at Childersburg, just a few miles south of Birmingham.

"This relatively new industry was born on a quail hunt and reared in a laboratory," it was explained.

"In 1932 the late Dr. Charles H. Herty, of Savannah, went bird hunting near Waycross, Ga. While passing through a pine thicket, Dr. Herty casually picked up a pine chip just cut from a sapling.

"Idly he sniffed the chip, and to his surprise it did not smell resinous. Thus was born the suspicion that if pine was not overly resinous, or only slightly more so than Canadian spruce, chief source of U.S. newsprint, a way could be found to make paper from pine.

"Shortly after his return to Savannah, Dr. Herty occupied hours on end analyzing pine chips. He confirmed his original suspicions, and then began a tour of Georgia to arouse interest.

"In the process he interested a New York firm with southern offices, eight Georgia daily newspapers, several individuals and even the State of Georgia, which gave him $20,000 for research. The newspapers, the Certain-

(Continued on page 22)

Great Lakes Profit Rises 89 Per Cent

TORONTO — For the first six months of this year Great Lakes Paper Company showed a net profit of $888,951, 89 percent higher than the comparable 1946 figure of $468,628, and an operating profit 62 percent higher.

The better results reflect the capacity operations of the plant, some speeding up of the newsprint machines due to capital expenditures under the modernization program to improve the capacity and efficiency of the mill, as well as the increase in the price of newsprint and sulphite pulp on April 1, 1947.

The net profit for the first six months of 1947 is equivalent to $4.44 on the combined Class A and B stocks (100,000 shares each) and $1.76 on the 400,000 new common shares outstanding as compared with $5.31 and $1.73 respectively for the whole of 1946. If the net profit is doubled to bring it to an annual basis, it would indicate earnings of $8.89 on the combined Class A and B stocks and $3.52 a common share.

Doubling these figures cannot be justified due to changing conditions. For example, wages have recently been increased which will change results for the latter half of this year.

Marinette Distributes Awards

MARINETTE, Wis. — Eleven employes of the Marinette Paper Company received awards totaling $142.50 during August for submitting acceptable ideas dealing with production and safety at the local mill. The company started the award policy in 1944. Awards range from a minimum of $7.50 to a maximum of $500.

FINANCIAL RECORD OF THE WEEK

New York Stock Exchange

High, Low and Last for Week Ending September 6, 1947

STOCKS

	High	Low	Last
A. P. W.	....	....	....
Armstrong Cork Co.	46⅝	46	46½
Armstrong Cork Co., pf.	....	....	....
Celotex Corp.	28⅞	27⅞	27⅞
Celotex Corp., pf.	20⅜	20¼	20⅜
Certain-Teed Products Corp.	17⅜	16¾	17⅛
Certain-Teed Products Corp., pf.	....	....	....
Champion Paper & Fibre Co.	24¼	23¾	23¾
Champion Paper & Fibre Co., pf.	109½	108⅜	109½
Congoleum Nairn Co.	30¼	29¾	29¾
Container Corp. of America	40¾	39¼	39¾
Container Corp. of America, pf.	....	....	....
Crown Zellerbach Co.	31⅜	31¼	31¼
Crown Zellerbach Co., pf. 4.20	107⅜	107	107⅛
Crown Zellerbach Co., 4 pf. 4	118⅝	117	117¼
Dixie Cup Co.	40	37¾	38¾
Dixie Cup Co., A	53	51½	53
Flintkote Co.	34⅞	32½	32¾
Flintkote Co., pf.	....	....	....
Robert Gair	9⅛	8¾	9⅛
Robert Gair, pf.	20	20	20
International Paper Co.	48⅜	46⅝	47½
International Paper Co., pf.	....	....	....
Johns-Manville Corp.	44	41½	42¾
Johns-Manville Corp., pf.	119	118¼	119
Kimberly-Clark Corp.	24⅞	24⅛	24⅛
Kimberly-Clark Corp., pf.	110¾	110	110¾
Mac Andrews & Forbes	38	38	38
Mac Andrews & Forbes, pf.	....	....	....
Marathon Corp.	24	23	23½
Mead Corp.	20	19¾	20
Mead Corp., pf. 4¼	95	94	94
Mead Corp., pf. 2	....	....	....
National Container Corp.	14⅜	13⅞	14
Paraffine Companies, Inc.	69½	69½	69½
Paraffine Companies, Inc., pf.	....	....	....
Rayonier, Inc.	26⅛	25⅝	25⅞
Rayonier, Inc., pf.	37⅜	37½	37½
Ruberoid Co.	56¾	55	56
St. Regis Paper Co.	10½	9⅞	10
St. Regis Paper Co., pf.	95	94¾	95
Scott Paper Co.	46¾	46¾	46¾
Scott Paper Co., pf.	103¾	103½	103½
Sutherland Paper Co.	42	42	42
Union Bag & Paper Corp.	34½	32½	32⅝
United Paperboard Co.	16	14⅛	15½
U. S. Gypsum Co.	102½	99	101
U. S. Gypsum Co., pf.	188¾	188¾	188⅜
West Virginia Pulp & Paper Co.	41⅞	40⅞	41
West Virginia Pulp & Paper Co., pf.	....	....	....

BONDS

Abitibi Pulp & Paper Co., 5s '53	....	....	....
Celotex Corp., 3½s '60	....	....	....
Certain-Teed Products Corp., 5½s '53	....	....	....
Champion Paper & Fibre Co., 3s '65	103⅜	103⅜	103⅜
Mead Corp., 3s '68	....	....	....

New York Curb Exchange

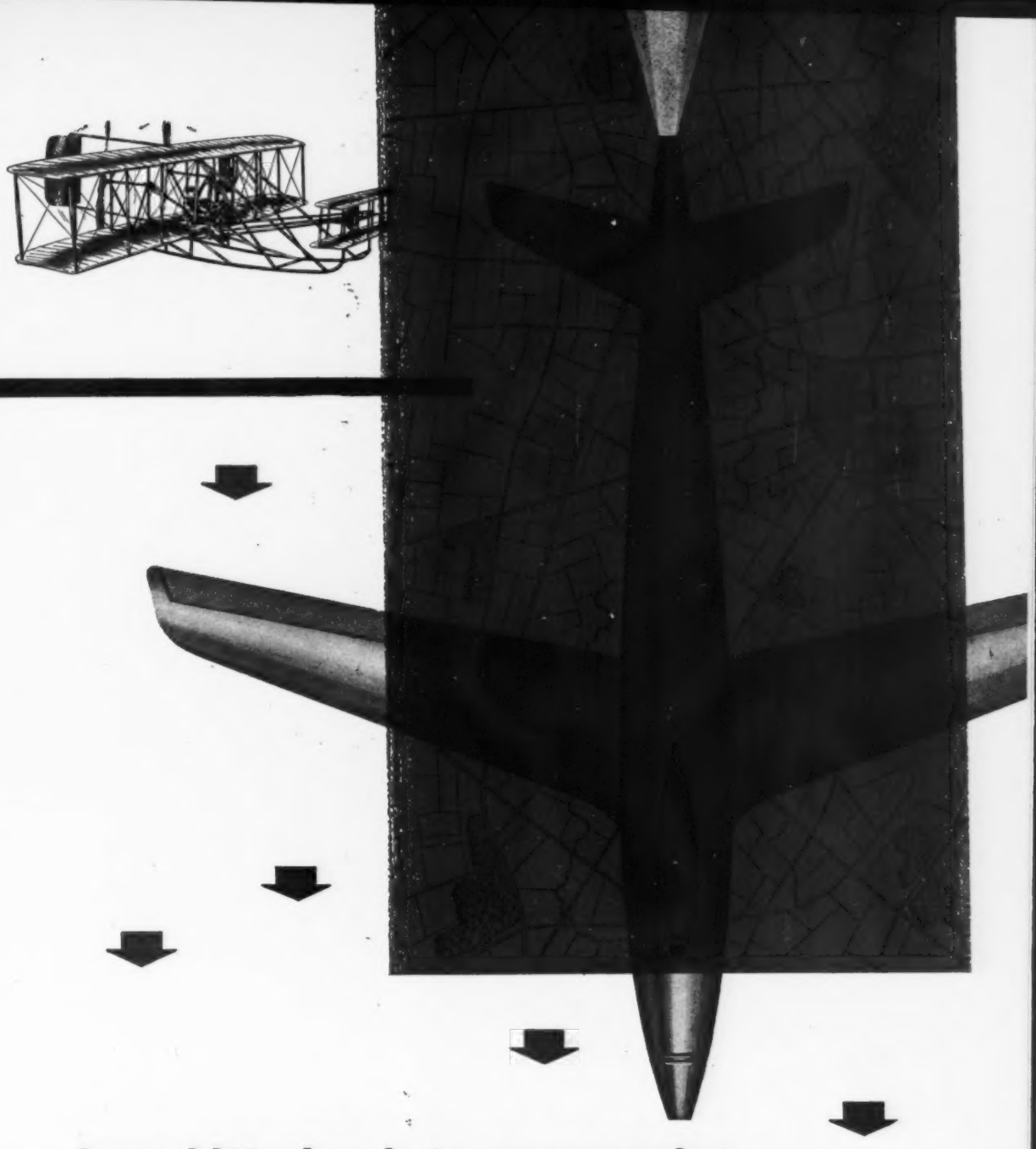
High, Low and Last for Week Ending September 6, 1947

STOCKS

	High	Low	Last
Great Northern Paper Co.	44½	43½	44
Taggart Corp.	....	....	....

BONDS

American Writing Paper Co., 6s '61	....	....	....



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TAPPI Meets at Appleton to Launch Fall Meeting Series

APPLETON, Wis.—The first of the five fall meetings of the Technical Association of the Pulp and Paper Industry was held at Appleton, on September 3-5. The meeting theme was "The Nature of the Chemical Components of Wood" which was sponsored by the TAPPI Fundamental Research Committee, Harry F. Lewis of the Institute of Paper Chemistry, Chairman. About 180 attended. These included the outstanding wood, cellulose and lignin chemists of the country.

Since the presentations and discussions were very complex and will be published in full later as a TAPPI monograph there will be but little comment upon them in this report.

The meeting was opened by W. F. Gillespie, President of the Technical Association who commented upon the great loss to the Association of its President, Worthen E. Brawn, who had done so much to plan the fall meetings.

Harry Lewis indicated that the present meeting was, in fact, a continuation of the series of meetings on fundamental subjects that was started last fall at Detroit. He expressed regret that Dr. Erdtman of Stockholm, Sweden, who expected to attend and be a principal participant could not be present because of plane reservation difficulties. He announced, however, that Dr. Erdtman will visit this country and participate in the Fundamental Research meeting to be held next fall. Dr. Westbrook Steele, Executive Director of the Institute of Paper Chemistry extended the greetings of the Institute, as host and indicated his desire to have the Institute serve those present in any way possible.

Dr. Lewis expressed the need for concerted effort in the study of wood chemistry to bring about the full utilization of this important raw material. He indicated that the loss to the industry of two to three million tons of lignin in waste liquor represents a deplorable situation. Lignin is the most abundant reproducible source of organic materials. He pointed out that one of the main objectives of the meeting was to provide collective thinking to bring about a concerted effort to identify and solve some of the major problems of cellulose and lignin chemistry. He indicated that there are far too few qualified workers in this very important field.

Cellulose and Lignin

The two leading speakers who keynoted the meeting were Emil Heuser who talked on "Unsolved Cellulose Problems" and Frederich Brauns who discussed Lignin. Both men are on the Institute of Paper Chemistry staff.

Following the exceptionally thorough presentation by Dr. Heuser, Dr. Herman Mark of the Polytechnic Institute of Brooklyn, N. Y., and Dr. George Ritter of the Forest Products Laboratory led a discussion of the various fields of research in cellulose chemistry that was indicated by Dr. Heuser's paper. Among them were chain-length distribution, hemicelluloses and their derivatives, holocellulose, molecular weight, structure of cellulose and hemicelluloses, hardwood vs softwood cellulose, analysis of mannose, microorganism attack on holocellulose, methylation studies, industrial utilization of hemicelluloses, and structure of partly hydrolyzed products. In opening his presentation Dr. Brauns indicated that he had two objectives, first to show show how little has been actually proven about lignin, and second, to stimulate an extensive discussion of the various phases of lignin chemistry, Work in this field is very difficult since no method has yet been found to isolate lignin quantitatively in an unchanged state and second, it is usually obtained and an amorphous, apparently high molecular product which is difficult to handle because of its peculiar chemical and physical properties.

The next speaker on the lignin program was Alfred Russell of the Northern Regional Research Laboratory at Peoria, Ill. Dr. Russell's presentation was unusually novel. Until a few months ago he had been a tannin materials chemist but in joining the Peoria Laboratory he had to devote much concentrated effort in getting abreast of the knowledge concerning lignin chemistry. His background in the related field enabled him to evaluate the record of work that had been done and many of the conclusions appeared to him to be unlikely. In studying the preparation of vanillin from lignin he felt that by reversing the process he should produce lignin. This he proceeded to do experimentally and produced a product that appears to have many of the properties of spruce lignin. This he designated as poly-8-methoxydihidrobenzopyrone. Although many of the highly qualified lignin chemists present felt that his conclusions were an over-simplification of the problem and since there was but little experimental evidence presented it was decided to have a small group meet with Dr. Russell to discuss the details relative to additional experimental work to be done to determine the plausibility of his conclusions..

Dr. Pearl of the Institute read a paper covering the phenolic constituents of wood. This was the subject that Dr. Erdtman intended to handle. Dr. Pearl pointed out that some woods were not easily pulped by the sulphate process. Although it was formerly claimed that this was due to high resin content, subsequent work has indicated that this is not the cause of the difficulty. Rather, it is now felt that heartwood contains alcohols and/or ketones that prevent pulping action. Dr. Erdtman has found a monomethyl ether which he calls pinolsylvin that causes this trouble.

Other Components of Wood

Dr. W. Pigman in substituting for Louis E. Wise who was ill and unable to be present discussed the hemicelluloses, covering such materials as glucoronic acid, mannose and xylose.

In the lignin session Prof. Ralph L. Shriner of the State University of Iowa gave an extremely interesting lecture on A Review of the Wood Coloring Matters. In this talk he indicated the organic chemistry involved and showed how certain arrangements of the structural formulas of the organic chemicals present controlled the coloring matter of various trees and plants.

In the cellulose session of Friday, September 5th, Prof. Roy L. Whistler of Purdue University introduced the subject of gums and mucilages and was followed by Prof. E. V. White of the Univ. of Idaho who presented a review of the chemistry of pectins and gums and described his own work on mesquite.

J. C. Pew of the Forest Products Laboratory at Madison, Wis., presented a paper during the lignin session on Flavanone in Douglas Fir Heartwood and Its Influence on Sulphite Pulping.

G. C. Harris of Hercules Powder Company talked on "Wood Resins" and E. S. Flinn of the Mead Corporation, Lynchburg, Va., gave a report covering the subject of "Wood Tannins."

Many of those present expressed much appreciation for having such an unusually fine program presented and for bringing together the outstanding leaders in the fields covered.

Those present were:

Daniel O. Adams, Bror Anderson, Leslie H. Andrews, G. W. Batchelder, H. M. Barnes, Martin A. Baum, Cornelius Betten, Jr., J. C. Bletzinger, H. C. Brill, E. H. Brink, David L. Brink, A. H. Bump, William H. Burk, L. A. Burkhardt, Abbott Byfield, John B. Calkin, Ira T. Clark, Arthur A. Coffin, Lloyd M. Cook, Dr. A. J. Corey and John Cornell.

H. C. Crandall, James W. Davis, J. D. Dickson, Jr., Irvin B. Douglass, J. R. Dudley, R. T. Elias, Reid G. Fordyce, Dr. K. W. Fries, William C. Gallagher, Carl Geiger, W. F. Gillespie, Ralph E. Glading, J. J. Goss, C. M. Green, W. S. Grimes, George J. Hajny, J. A. Hall, Elwin E. Harris, John F. Hechtman, Arthur A. Hibbeler, Edward H. Hill, David Hogan, B. G. Hoos, Mildred Malm Hossfeld, Ralph Hossfeld, E. J. Howard, C. E. Imhoff and D. T. Jackson.

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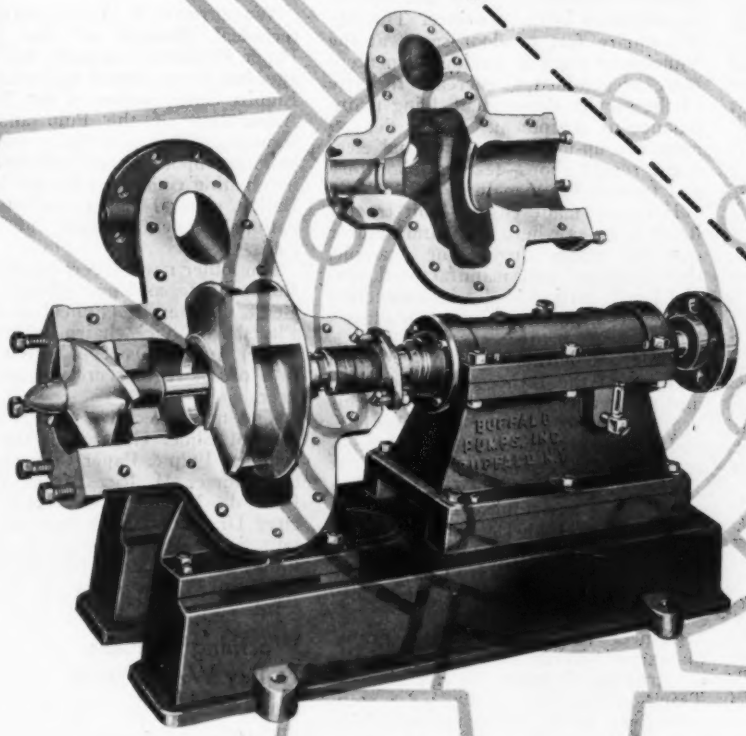

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Additional registrants: A. P. Adrian, Arthur B. Anderson, Joe Atchison, Don Davis, Dr. E. S. Flinn, Fred Hanson, A. M. Heald, Lyle E. Hessler, Albert S. O'Brien, Dr. K. A. Taylor, A. W. Ayles, G. J. Brabender, Dr. H. Y. Charbonnier, R. F. De Long, R. A. Diehm, Nicolas de F. Elsovanm, C. Graves, John A. Hanson, Edwin C. Jahn, Vern L. Joseph, A. T. Luey, R. T. Mills, Raymond L. Mitchell, George P. Mueller, J. H. Smart, Robert M. Stuart, Jorge R. Succar, Carola Trittin and Leslie E. Wellman.

R. W. Cairns, Paul Easton, Clifford A. Flanders, George C. Harris, John T. Hayes, H. B. Merrill, Emil Ott, Peter Van Wyck, V. E. Varhus, E. Heuser, F. Brauns, W. Pigman, M. Buchanan, H. Lewis, L. Wise, Ed Jones, Gary Jones, Curtis Walseth, Francis Ratliff, John Barton, B L. Browning, Merle Heath, R. Shallcross, Sidney Wells, Otto Kress, A. Yundt, W. McPherson, G. Martin, W. Dappen, W. Shockley and J. Green.

Brennan and Justuson Take Seymour Mill

SEYMOUR, Conn.—Owen J. Brennan, general manager, and Andrew Justuson, plant superintendent, of the San-Nap-Pak papermill in Wheelwright, Mass., have resigned to acquire controlling interest in the Seymour Paper Company.

Mr. Brennan has been with the San-Nap-Pak Company since graduating from Massachusetts State College in 1936. His employment was interrupted by four years' service as a major in the recent war. Mr. Justuson came to the company from Clayville, N. Y., six years ago.

Chas. T. Main Moves Into Larger Office Space

BOSTON, Mass. — As of October 1, Chas. T. Main, Inc., Boston's well-known engineering organization, will occupy new and larger quarters on the fifteenth floor of the Chamber of Commerce Building, where they are consolidating their Boston offices.

Finning Tractor Firm Covers All Victoria

VANCOUVER, B. C.—Finning Tractor & Equipment Co. Ltd. has steadily developed at Vancouver and now has 225 employees as contrasted with eight when E. B. Finning founded the firm in 1928.

From their central Vancouver location at 940 Railway Street and six branch offices at Duncan, Prince Rupert, Prince George, Vernon, Nelson and Cranbrook, Finning Tractor & Equipment Co. Ltd. offers the most complete machinery sales and service organization in the province. The 60,000 square feet of floor space at the Vancouver plant is having 10 percent more area added to increase the size of the service department doing maintenance of equipment. In this department are up-to-date welding and electrical repair shops, testing laboratory and track press machines.

Here are made custom-built tractor items in cases where the manufacturer can not supply them. For example, they designed and manufactured special brush cutting blades in connection with the department of agriculture's land clearing project.

Finning's marine division serves all sections of the B.C. coast for engines and parts with a contact vessel. This year's high boat among both the U.S. and Canadian halibut fleets was powered by a "Caterpillar" diesel.

The Vancouver and Vernon offices serve B.C.'s agricultural industry with "Caterpillar," John Deere, Killefer and allied lines of farm machinery.

Forest industries are served by Skagit, Hyster, Young and Atkins logging equipment.

Pioneer rock crushers and gravel plants are offered by Finning's to the construction industry in addition to Trackson shovels.

Sullivan air compressors, rock drills and other equipment help this province's mining industry, while Athey loaders ease industrial lifting jobs.

An efficient staff under F. J. Doyle, sales manager, comprises a team that makes Finning Tractor & Equipment Company Ltd. synonymous with service to British Columbia's industries.

York Paperboard Plant Is in New Hands

YORK, Pa.—The York Paper Manufacturing Company has been sold to Joseph DiCandia, New York waste paper plant owner for $300,000 and plans were announced by the new owner for an expansion program.

The actual price on the deed registered at the Recorder of Deeds office in the court house was $283,000, but $17,000 was subtracted as consideration for stock on hand. DiCandia paid $23,000 and mortgaged the rest of the sale price to the company at two and one-half percent interest.

The plant, located in Springettsbury and Spring Garden townships, now employs about 25 men in the manufacture of paper board used for boxes and building construction. DiCandia said he hopes to expand production to employ 75 men. His New York plant will ship waste here for conversion.

The company was represented by its president, Fred L. Bradley, and Attorney Allen C. Wiest. Spencer D. Wareheim, York attorney, and Vincent J. LaGamma, New York attorney, represented DiCandia.

Empire State TAPPI Elects Jaffe Head

WATERTOWN, N. Y. — Martin Jaffe, technical director of the National Paper Products Company, Inc., Carthage, has been elected chairman of the Empire State Section of the Technical Association of the Pulp and Paper Industry. This was the result of the balloting upon a slate submitted by a nominating committee headed by H. P. Bailey, general manager of the International Paper Company at Niagara Falls.

The other new officers consist of Dr. James Foote, assistant manager of the Berst, Forster & Dixfield division at Plattsburgh, vice chairman, and Earle Foster, of the Oswego Falls Corporation of Oswego, secretary and treasurer.

The new executive committee consists of Elmer Godfrey of the Dexter Sulphite Pulp & Paper Company, Dexter; Homer M. Rice of the E. I. du Pont de Nemours & Company, Inc., city; Dr. A. H. Nadelman of the International Paper Company, Niagara Falls; Henry Fales, chief engineer of the Scott Tissue Company, Fort Edward.

Worthington Plans To Buy WAA Plants

HOLYOKE, Mass.—The Worthington Pump and Machinery Corp. is planning to buy government plants built during the war which Worthington operated.

In Holyoke two large buildings were put up by the federal government on the Appleton St. property of Worthington. Worthington is using these properties now and negotiations are underway for their purchase along with similar plants at other Worthington sites. This will be a boon to Holyoke for it will place on the taxable property lists these buildings which, because they belonged to the government, were not subject to local taxation.

The money for these purchases is coming from the $15,000,000 loan Worthington has negotiated with Guaranty Trust Co., of New York and other banks. This loan matures in 1954 and will be subject to a repayment scheduled beginning next March 31. The company has paid a $6,000,000 loan arranged last year as well as current bank borrowings of $4,000,000. The balance of the $15,000,000 loan, which is $5,000,000, will be used for plant acquisitions.

Lowered Costs Through Longer Wear

Leading paper mills throughout the country are experiencing important savings in their dryer felt costs with Woodberry 887.

Asbestos yarn woven into the face of Woodberry 887 re-enforced dryer felts, at scientifically determined intervals, protect the contact surfaces against wear, add to length of service, and reduce costs per ton of paper.

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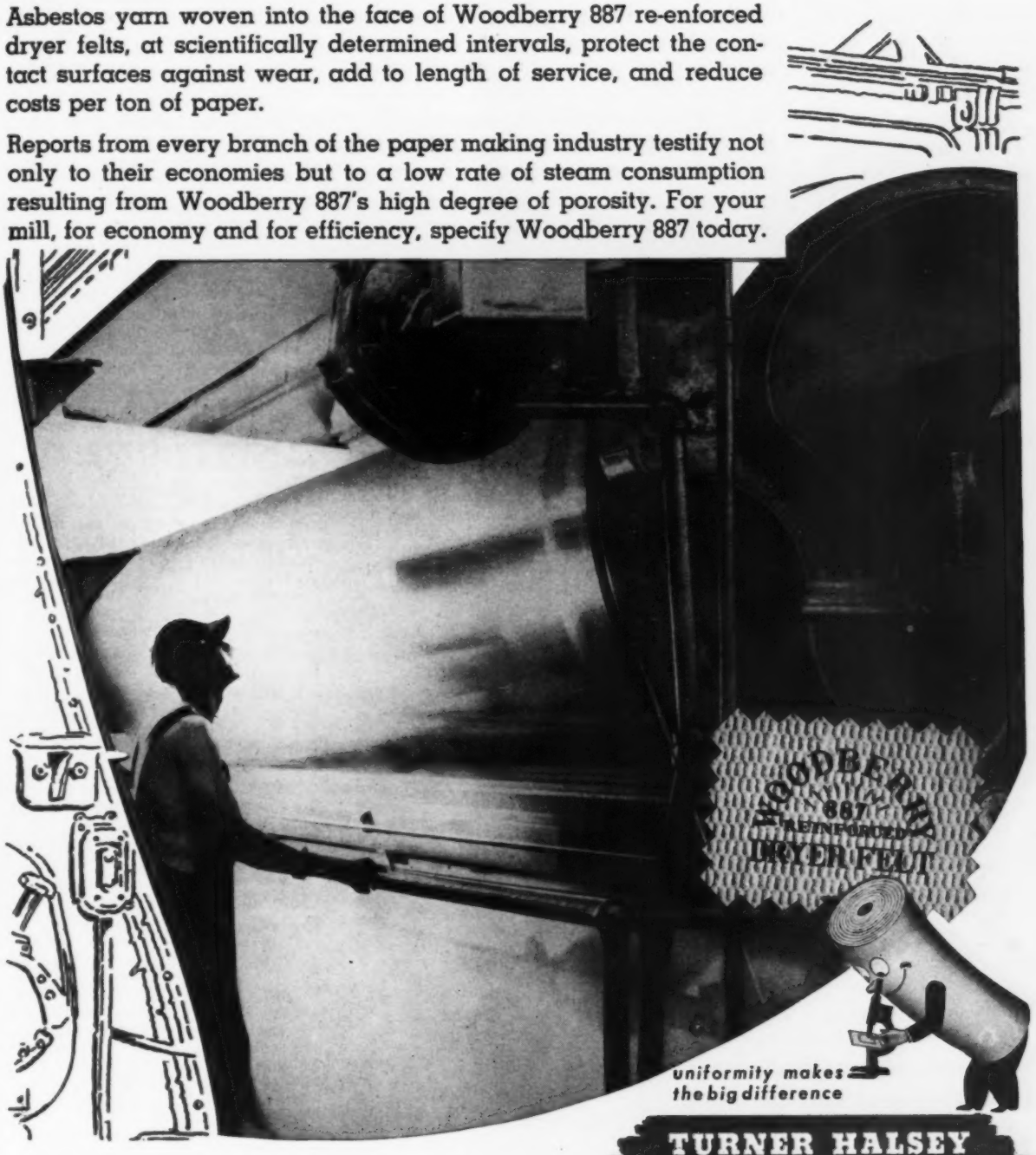

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Canada Examines Effect of Dollar-Saving on Exports

(Continued from page 9)

ing in the forthcoming visit of Chairman Clarence J. Brown (Rep. Ohio) and the House of Representatives committee on Newsprint on October 7-9. Mr. Brown has announced that the committee has been invited by Premier George A. Drew of Ontario and will confer with Ontario government officials and newsprint manufacturers on that date at the Royal York Hotel in Toronto. Newspaper publishers and others interested will also attend the conference.

The House committee will inspect the Thunder Bay mill of the Abitibi Power and Paper Co. at Fort William, Ont., on October 11. After a meeting in Chicago, the committee will inspect newsprint mills in the midwestern and southern United States, will visit sites of proposed new mills in the southern States and make a special investigation of new paper manufacturing processes being developed in Georgia.

Members of the newsprint committee are Brown and Representatives Charles Wolverton (Rep. N. J.), Paul Shafer (Rep. Mich.), Charles Vursell (Rep. Ill.), Lindley Beckworth (Dem. Tex.), Richard Harless (Dem. Ariz.), and Robert Sikes (Dem. Fla.).

Pulp and paper operators in Canada and investors in their stocks are also awaiting with interest the sale on October 1, of 1,500 million cubic feet of Alaska national forest timber and the preliminary award to the highest qualified bidder. The timber is intended for the manufacture of pulp and paper and the purchaser is required to build a $20 to $30 million pulp mill in the Tongass National Forest. The proposed sale is the first of a number planned to support the development of several similar mills and dependent communities in southern Alaska, it is understood here. The results of the first bid will give pulp and paper operators some clue as to how seriously they must regard the possibility of competition from Alaska.

Badger-Globe Mill Sets New Safety Marks

NEENAH, Wis. — The 600 mill and office employes of the Badger-Globe mill of Kimberly-Clark Corporation have established two new safety records, according to E. E. Glomstead, mill safety man. There has been no on-duty lost-time accident for the sixth consecutive calendar month, and the mill's engineering department completed 500 safe days on September 3.

More than 750,000 man-hours have been worked at the mill since the last accident on February 5 of this year, setting the best record for the mill since 1934, when the present safety records were started. Ninety employes in the engineering department have worked 275,000 safe hours.

Frank Redmond Talks At Kimberly

KIMBERLY, Wis. — Employes of the Kimberly mill of Kimberly-Clark Corporation heard a talk by Frank Redmond, cartoonist, humorist and secretary of the Associated Industry of New York, Monday evening, September 8, at the clubhouse.

His appearance was sponsored by the Kimberly Mill Foremen's club and the mill safety committee.

BRITISH PUBLISHER VISITS PAPER SOURCE

Lord Rothermere, chairman of Associated Newspapers, of England, and associate executives of the Anglo Canadian Pulp and Paper Company are seen shortly after their arrival last week for a short stay at Chateau Frontenac, Quebec. Left to right are: A. S. Fuller, director of Anglo Canadian; Denis Walsh, legal advisor; Elliott M. Little, president of the paper company; and Lord Rothermere, whose chain controls London Daily Mail, Evening News and Sunday Dispatch. He will sail shortly from New York.

Ray Richards Expects Long Term Prosperity

APPLETON, Wis.—Prosperity for the pulp and paper industry will last several years, and American industry as a whole can emerge from present unsettled conditions without a depression, in the opinion of Ray Richards, international vice-president of the Pulp, Paper and Sulphite Workers Union, who spoke before the Kiwanis Club here September 3.

He emphasized the peaceful labor relations in the industry and said that one of the first jobs of his union was to organize southern paper mills so that they would not be able to have an advantage over the northern mills because of wage competition.

At present, he declared, wage rates in paper mills are the highest in history. He was critical of newspapers for playing up labor trouble in the steel and automobile industries without mentioning the good labor relations in the pulp and paper industry. He said that bad labor news has been published to the exclusion of the good.

Referring to the Taft-Hartley bill, Richards said, "The government cannot legislate labor relations, but with mutual confidence labor and management can get along together."

He stressed labor's stand against communism, pointing out that the AFL refused to send delegates to a recent international labor convention because representatives of Russian labor would be present, and "the AFL would not have free American labor delegates meet Russian slave labor."

Richards said that James Killan, another vice-president of his international, had been sent by the AFL to work under General MacArthur in Japan to start a Japanese free labor movement before Russian influence could make itself felt in Nippon.

"We know that Communism is trying to make inroads in this democracy of ours. We know that they are trying to make inroads in unions. But we'll fight them to the last ditch," he said.

Combined Locks Staff Gets Six-Cent Boost

APPLETON, Wis. — Combined Locks Paper Company employees, Combined Locks, have been granted a six-cent hourly wage increase as the result of negotiations September 5 between company officials and union representatives. The base rate now is 96 cents an hour for men and 90 cents for women. Shift workers will receive $1 an hour for a 48-hour week.

The increase was negotiated by Ray Richards, international vice-president of the Pulp, Sulphite and Paper Workers, and Edward Gilbertson, international representative of the Brotherhood of Paper Makers. L. C. Palmer, personnel director, and R. F. Dunger, treasurer, represented the company.

Designers put this project on an Economical Permanent Footing with

KOPPERS
PRESSURE-CREOSOTED PILES

A common problem—providing a firm, *enduring* foundation in unstable soils—faced the designers of this large industrial building. To solve it, they chose a pile material whose permanence and economy have been conclusively demonstrated in thousands of applications—pressure-creosoted wood.

Koppers Pressure-creosoted piles were driven in the wall trench, and under the floor area. These multiple supports eliminate settling hazards. The treatment gives enduring protection against decay, permitting cut-offs above the water table to be safely made. It also fortifies the piles against insect attack.

The *permanence* of pressure-creosoted piles is demonstrated by the old buildings founded on them . . . and present-day *economy and effectiveness* are indicated by the many modern buildings that use this proven method of overcoming soil handicaps. Koppers Pressure-creosoted piles permit economical development of areas where water tables are below pile cut-offs. They provide adequate bearing value in constructing foundations for heavy bridges or machinery. And they are an accepted means of equalizing support when part of the building is over filled or soft ground.

Koppers is equipped to treat piles up to 125 feet in length, and the delivery situation is excellent. If you have a foundation problem, get in touch with Koppers.

Piles in trench will be capped by wall; others by floor slab.

Reinforcing rods for floor slab. Piles can be seen below.

Floor partially poured. Lower reinforcing is covered.

KOPPERS PRESSURE-TREATED WOOD

KOPPERS COMPANY, INC.

PITTSBURGH 19, PENNSYLVANIA

Latin-America Boosts Carbon Paper Output

WASHINGTON, D. C. — Mexico and Argentina have attained a certain measure of domestic production of carbon paper and typewriter ribbons, which otherwise are imported largely from the United States, the Department of Commerce states in a special study of these manufactures in the Latin American countries named.

In 1946, Mexican consumption of carbon paper was approximately 55,650,000 sheets, with Mexican government agencies, national, state and local, accounting for some 55 percent of consumption. By 1946 the United States was supplying 99 percent of total imports, although prior to the war, Germany, Austria and Italy were the principal sources of Mexico's imports of this commodity.

Three manufacturers, centered around Mexico City, now make carbon paper their combined output amounting to approximately 40 million sheets. Typewriter carbon paper is the principal type made. Production by type of tissue used is estimated at 50 percent pure sulphite, 25 percent pure rag and 25 percent a combination of both.

All semi-finished tissue was obtained from the United States in the war period, but the Department reports a feeling in Mexican consumption that United States-produced tissue is of inferior quality and as it is higher in price, Mexican manufacturers are said to be again seeking their pre-war suppliers in Great Britain and Finland, who prior to the war, furnished rag tissue and sulphite to Mexico.

In Argentina, the Department reports, six manufacturers are now making carbon paper, although the Argentine product is described as of mediocre quality. Output is now approximately 75,000 kilograms annually, allowing for increased capacity in recent years.

Two United States manufacturers were reported by the Department as negotiating with Argentine firms toward establishing branch plants in the country. If this development is consummated, it is added, trade sources there believe Argentine production would soon be self-sufficient, and of improved grade.

Argentine consumption of carbon bon paper was approximately 110,000 kilograms in 1946, of which 35,000 represented imports. The government has recently become a heavy consumer, using between 25,000 and 30,000 kilograms per year. However, government agencies were said to buy from the lowest bidder, regardless of quality, though private users demand a quality paper.

The United States made gains in 1945 and 1946, but the United Kingdom was the principal source of Argentine imports of this paper in both years.

B, S & W Starts First Test Run of Pulp

Initial manufacture of a few tons of pulp was started at the new pulp and paper mill of Bloedel, Stewart & Welch Ltd. at Port Alberni, B.C., recently, for experimental purposes. Conveyors installed at the bottom of the huge chip storage tanks were put into operation and one of the three digesters was filled up for a trial "cook."

The experimental run was made possible by the fact that steam and power was available from the power plant of the Bloedel, Stewart & Welch sawmill, as the mill was not operating during the week-end. Full operation of the newly-constructed pulp mill must await the delivery of power over the B.C. Power Commission lines from Campbell River.

Hurlbut Staff Plays At Annual Clambake

LEE, Mass.—Employees of the Hurlbut Paper Company held a clambake Sunday at Camp Mahkeenac on Stockbridge bowl. The general chairman was Albert Beaujean while Philip Kingdon was co-chairman.

The following committees also served: Sports, Edward Spiewak, Richard Wells, George Sera, Lester Philips, Norman Potter, David Chesneau, Stanley Olzerski, Frank Koloski, Louise Olzsewski, Marion Vreeland, Mrs. Theodore Sparks, Marion Tyer; tickets, Ira Bissell, Louise Longera, Olga Faltraco, Americo Montani and William Finnegan; refreshments, Edward Spiewak and Samuel Huggins; first aid committee, Olga Faltraco; and publicity, Peter Gajewski.

Smith Paper Mills Go On Five-Day Schedule

LEE, Mass. — Walter F. Tatum, vice-president and general manager of Smith Paper, Inc., has announced a new work schedule for the mills. Effective at once, the mills will go on a five-day weekly schedule in all departments. The reduction in the work week, Tatum explained, is caused by the unsettled markets abroad and at home. The Niagara mill will be closed temporarily and its personnel will be absorbed throughout the operating mills.

Midwest Waste Prices Unchanged

Waste paper prices held unchanged from last month in the September mill prices posted the first of the month. Movement of supplies held fairly steady according to the trade. Mills were reported to be continuing to quote $12 a ton for No. 1 mixed paper; $18 to $20 for No. 1 news; $30 for No. 1 old corrugated.

Koegel Settlement Terminates Strike

HOLYOKE, Mass.—The two-week-old strike at the Charles Koegel & Son Co., paper machinery manufacturers of 306 Race Street, was ended Sept. 3, when members of the United Electrical, Radio and Machine Workers Union of America, CIO, agreed to contract settlements to bring the labor dispute to a close.

Leon Massa, business agent of the CIO local, No. 259, disclosed the settlement following a conference between union representatives and Atty. Edward Cooley of Springfield, counsel for the firm. The workers agreed to go back to work after winning all of their major demands.

The tentative agreement, scheduled for signature later this week, provides for a 10-cent hourly wage raise, two weeks' paid vacation for five-year workers and one week for others, six paid holidays a year, and top seniority for the chief steward who heads the Koegel branch of Local 259. The present chief steward is Paul Hemelin.

Twenty-six employes of the paper machinery manufacturing firm were involved in the two-week walkout.

South Takes Census Of Paper Revenues

(Continued from page 14)

Teed Corporation and the individuals forked over money or materials to give the doctor around $100,000.

"It was nearly seven years, however, before the transition could be made from laboratory to commercial operation. Finally, the Southland plant was constructed and began operations in 1940.

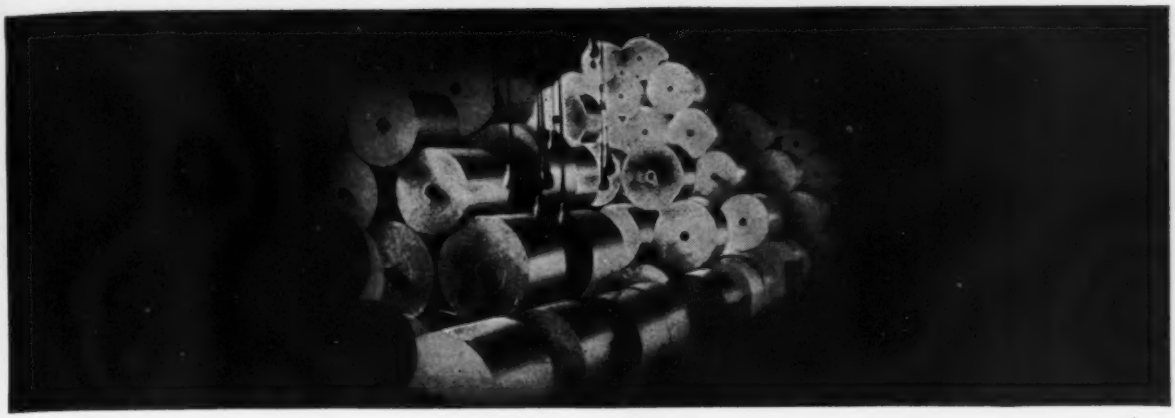
"The production of the plant was snapped up quickly, and in 1944 Southland completed an addition which gave it a capacity of 170 tons daily. Now Southland is spending $6,500,000 for a second addition to double its capacity.

"The newly organized Alabama firm, incorporated as the Coosa River Newsprint Company, has purchased 615 of the 18,000 acres owned by the Government at Childersburg and leased a number of buildings, including a 25,000-kilowatt steam plant.

"To obtain its pulp supply the Alabama company has purchased 50,000 acres of timberland and will draw on a total of 250,000 more.

"The construction of the Childersburg plant and the expansion of the Southland mill has been hailed by virtually every daily newspaper in the South, which has been hampered by the shortage and high price of Canadian newsprint.

"Moreover they have seen in this growing industry another step forward in the South's efforts to improve itself economically by more efficient utilization of its human and natural resources."



For starch-clay paper coatings

with high water-resistance

use economical

P-364A BECKAMINE

You've probably heard talk about a resin that's opening up new channels in the manufacture of water-resistant starch-clay coatings for paper. *This is it*—a recent result of RCI research in urea-formaldehyde resins. P-364A readily forms a chemical union with enzyme-converted, acid-hydrolized or chlorinated starch. It can be added to the starch during the cook, at top heat as a chill-back, or to the cooled adhesive. In addition to improving the "wet rub" of coating colors, P-364A likewise increases their brightness and usually results in a higher wax test. And it's economical—normal applications require only 15% resin solids content, based on dry starch. Write for a working sample.

REICHHOLD CHEMICALS, INC.

RCI

General Offices and Main Plant, Detroit 20, Michigan

Other Plants: Brooklyn, New York • Elizabeth, New Jersey • South San Francisco, California • Seattle, Washington • Tuscaloosa, Alabama
Liverpool, England • Paris, France • Sydney, Australia • Zurich, Switzerland • Milan, Italy • Rio de Janeiro, Brazil

SYNTHETIC RESINS • CHEMICAL COLORS • PHENOLIC PLASTICS • INDUSTRIAL CHEMICALS

Sales Records Win Scott Promotions

(Continued from page 10)

service. Following his return he became Kansas City district manager. A reputation for excellent judgment and a thorough approach to many assignments are contributing factors to his success in the distribution of our products.

Jamie Phillips moves from Birmingham to Dallas as retail district manager. He started in 1941 as a salesman in Atlanta. A few months later he went to Tampa in the same capacity and became Birmingham district manager January 1, 1942. Before the end of the same year, he added Nashville and Knoxville to his territory. Proven ability as an excellent manager and a fine salesman will be invaluable in his new capacity in Dallas.

Phil Murray shifts from Dayton to Buffalo as district manager. Phil joined the Scott Company in 1941 as a Detroit salesman, leaving a few months later for military service. Returning in the Fall of 1945, Phil again took up his duties as a Detroit salesman, becoming Dayton district manager in July, 1946. Among his outstanding characteristics are enthusiasm with which he handles selling assignments, aggressiveness and unbounded energy with which he has tackled selling problems.

Jim Merriman, leaving Chester for Kansas City, becomes retail district manager in that key mid-western market. His Scott history dates back six years and he became familiar with the company through sales promotion work. He spent four years in the service, returning in March, 1946. Jim's subsequent experience in the distribution research and development department has given him a splendid insight into market conditions.

Dan Evans entered the business in 1937 as an assistant in the traffic department. Five years later he joined the Navy. Upon his return early last year, he went to Boston as a retail salesman, operating in the New England market until his present advancement as Syracuse district manager.

With a background of five years in the finishing department John Carroll was enabled to learn the Scott quality and production concept. Following service in the Army, John returned to the company and joined the sales force. He went to Buffalo last year and outstanding success with the installation of paper departments and the development of the Scott store advisory service program are on John's list of accomplishments. His current promotion takes him to Tennessee as Nashville-Knoxville district manager.

Doug Fish has been made Dayton district manager, moving from Brooklyn where he was a salesman. Although his Scott association is of relatively short duration, he has demonstrated excellent capacity and appreciation of Scott's selling requirements since joining the company.

OBITUARY

Mrs. A. B. Hansen

GREEN BAY, Wis.—Funeral services were conducted September 2 at Grace Lutheran church here for Mrs. A. B. Hansen, wife of the president and general manager of Northern Paper Mills. She died August 31 at her home here after a long illness. Burial was at Marinette, Wis.

Mrs. Hansen was best known for her interest in Girl Scouting but was prominent in many civic and welfare activities. For the last three years she was regional chairman of the movement in Wisconsin, Illinois, Indiana and Michigan.

Since August, 1944, she had been a member of the city's board of park commissioners, and she also served as a director of the Associated Charities. She was a member of Grace Lutheran church and of the Order of Eastern Star. A graduate of Lawrence College, she was a member of Alpha Delta Phi sorority, of Phi Beta Kappa and Mortar Board, honorary scholastic organizations.

She had been flown to her home from Ann Arbor, Mich., the previous Friday, after having been a patient at University hospital since late July, when she returned by air from Europe, where she and her family were beginning a several months' tour of the continent.

She is survived by Mr. Hansen; a son, James, and a daughter, Barbara, both of whom remained in Sweden when the tour was interrupted by Mrs. Hansen's illness. Mr. Hansen sailed late last week on the Gripsholm to join them, and will remain abroad for several months.

Walter A. Elliott

LEONIA, N. J.—Walter A. Elliott, 74, veteran paper mill employe of Northern New York, died recently at the residence of his daughter, Mrs. Vincent A. Carberry, of 119 Sylvan Avenue, following a long illness.

Mr. Elliott was for 40 years identified in the paper making industry, having been located at Carthage, Baldwinsville, and New Hartford, N. Y., and Wainwright, Mass.

For 35 years, Mr. Elliott, a native of Waddington, had been employed at Carthage, first as superintendent of the Island Paper Company mill until 1930 and later as night superintendent of the National Paper Products Company.

Mr. Elliott spent his early life in Carthage. Upon leaving Carthage about 15 years ago he became superintendent of a paper mill at Baldwinsville and more recently, prior to his retirement in 1938, has been associated with mills at Leonia.

Alfred Stull Harris

CLEVELAND—Alfred Stull Harris, for more than a quarter of a century one of the outstanding leaders in the graphics arts industry, died in Cleveland Clinic Hospital, August 22. The 56-year-old president of the Harris-Seybold Company had been ill for several months.

Mr. Harris joined the graphic arts equipment firm as a draftsman in 1912, and for more than three decades devoted all his engineering talents to the development and improvement of the lithographic process and Harris presses. He was named vice-president in charge of engineering for Harris-Seybold in 1923 and became president in 1944.

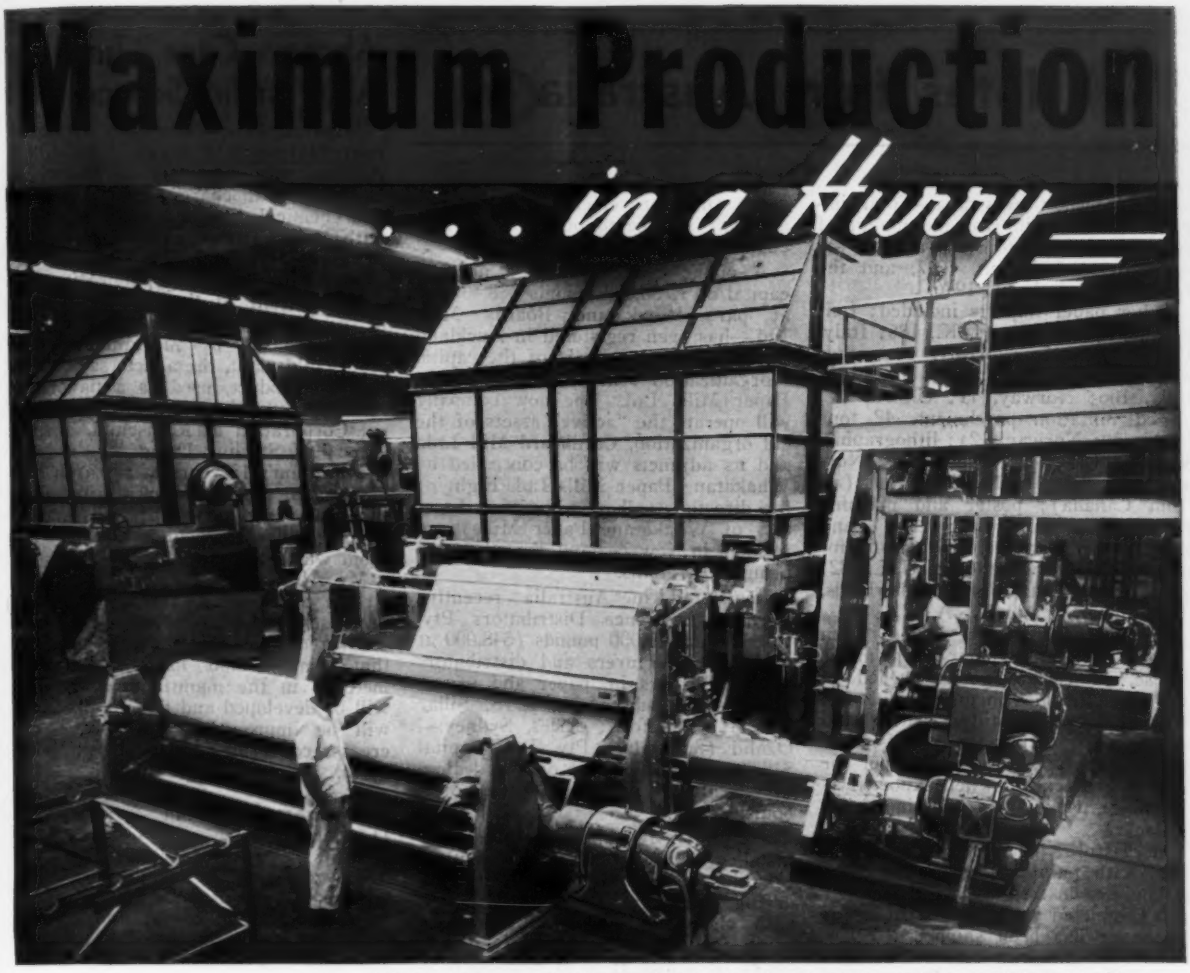
Mr. Harris traveled widely, visiting many offset plants in North America and Europe in an advisory capacity. He was known especially throughout the industry for his ability to translate lithographers' requirements into equipment that filled their needs. In 1936 he was instrumental in bringing higher press speeds to American lithographers through the adaptation of the revolutionary H.T.B. stream feed to Harris presses.

Mr. Harris' influence upon graphic arts equipment design was most valuable to the industry. He concerned himself not so much with the actual design of machinery as with advisory and consulting work toward facilitating construction and insuring the efficient operation of the press.

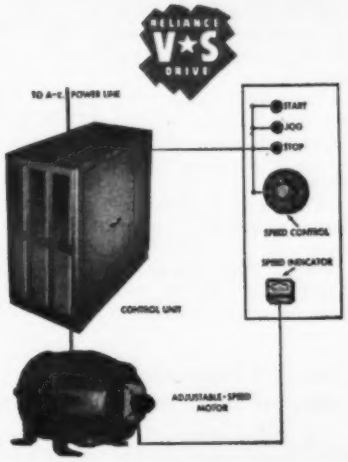
His tremendous interest in the development of the lithographic industry went beyond the equipment phase, and led to numerous improvements in the process itself. Under the leadership of Mr. Harris the Harris-Seybold Company has recently installed one of the most modern research laboratories in the world devoted to lithography and other graphic arts processes. Mr. Harris spent much of his time in the laboratory, where experiments are continually being conducted to develop new chemical products and new methods that will simplify and render more accurate the work of the offset lithographer.

His industry association activities were far reaching. He was a staunch supporter of the Lithographic Technical Foundation and at his death was a member of the research committee and the board of directors. The Harris Laboratory under Mr. Harris' leadership was always ready to cooperate with the Foundation Laboratory and other laboratories in the industry, in and work which was for the benefit of the graphic arts.

Maximum Production . . . . in a Hurry



The V★S System maintains required tension for this Modern High Speed Tissue Machine.



Conveniently-packaged, space-saving V★S Drives are available from 1 to 200 hp.

...with Reliance V★S Drive

V★S, the *All-electric, Adjustable-speed Drive operating from A-c. Circuits,* accelerates a machine so smoothly, maximum production is achieved *faster.* V★S also provides quick, smooth starts and stops, an infinite range of stepless speed changes, continuous maintenance of proper tension—plus other advantages to meet specialized needs in material processing. And with V★S on the job, operation is greatly simplified—through all-electric control either at the machine or from remote stations. For more of this money-saving V★S story, let us send you Bulletin 311-A.

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St. Louis • San Francisco • Seattle • Syracuse • Tampa • Tulsa • Washington, D. C. • Sao Paulo, Brazil

RELIANCE A-C D-C MOTORS

"Motor-Drive is More Than Power"

Notes from Australia

PERTH, West Australia—Total imports of newsprint for the month of April were 9,952 tons, as against the 9,075 tons of March, 1947, and the 7,431 tons of April, 1946.

Other paper imports included: Imitation art, 209 tons (U.K., 186; Italy, 15; Finland, 7; Norway, 1); other coated printings, 313 tons (U.K., 195; Italy, 106; Norway, 11; U.S.A., 1); glazed imitation parchment, 42 tons (U.K., 30; Norway, 12); lithographic, 88 tons (U.K., 48; Sweden, 29; Norway, 11); offset embossed, 3 tons (all from Canada); poster and machine glazed, 6 tons (all from Sweden); and other printing papers, 470 tons (Finland, 151; Norway, 131; U.K., 82; Sweden, 47; Canada, 40; Netherlands, 10; France, 7; and U.S.A., 2).

Regulations recently issued from Canberra ban the export, except under license, of certain goods needed in Australia. Included in the schedule are the following: Printing, writing and wrapping paper; paper boards, and goods manufactured from paper or paper boards except when exported as wrapping, packing or containers for goods.

Successful paper manufacturing trials with pulp prepared from New Zealand-grown insignis pine have now been completed in Australia. Some of this paper has been shipped to New Zealand as newsprint, and will be used in experimental printing by most of the N. Z. daily papers. The Commissioner of State Forests (Mr. Skinner) states that although several production difficulties have been encountered, the trials have shown definite promise of a high-grade product being obtainable from New Zealand-grown wood. The tests, however, were too short to permit of the highest possible quality being achieved, but this was because the Australian mills at which the experiments were made could spare no more time without interruption to their own production.

Mr. T. Somerville, chairman of New Zealand Paper Mills Ltd., at the recent annual meeting held in Dunedin, said that provided no major stoppage occurred, it was hoped to meet the wrapping paper requirements of the country some time during the current year. He stated that land adjacent to the company's mills had been acquired for future expansion, and a new factory for the manufacture of paper bags was nearing completion. "The raw material position," he added, "is satisfactory. The availability of electric power has been fairly well maintained as adequate supplies of coal have come forward. But the distribution of paper by coatal shipping continues to cause some anxiety, and it is hoped that the position may soon show an improvement to permit an adequate service to our North Island customers."

A public company with a nominal capital of 1,750,000 pounds ($8,400,000 at par)—Whakatane Boards Mills Ltd.—has been registered in Auckland (New Zealand) as part of the capital reorganization scheme of Whakatane Paper Mills Ltd. The new company will operate the "active" assets of the old organization, Cardboard Mill Ltd., and its adjuncts will be controlled by Whakatane Paper Mills Ltd. Eight of the directors (all of whom are directors of Whakatane Paper Mills) are resident in New Zealand, the other two being Australians.

Registered in Australia recently: Bernard Lawrence Distributors Pty. Ltd., capital 10,000 pounds ($48,000 at par); manufacturers and distributors of, and dealers in, paper and paperboards, etc. Subscribers, R. S. Sillar and H. C. Gifford; offices, Sydney.—Ozalid (Australia) Pty. Ltd., capital $48,000; manufacturers of and dealers in sensitized papers. Offices, Melbourne.

Sixty infra-red lamps were recently installed at the premises of Seamless Containers Pty. Ltd., East Sydney, for drying paper after it has been treated with chemicals. Provision has been made for the installation of further banks of lamps if it is necessary to increase production at a later date.

New machinery for the manufacture of cigarette papers has been ordered in England and France by Michelides Ltd., tobacco and cigarette manufacturers of Perth. Delivery, however, is not expected for at least 18 months.

In a recent address to members of the Victorian Institute of Advertising, Mr. W. Dunstan, V.C., general manager of The Herald & Weekly Times Ltd., chairman of Newspaper Supplies Pty. Ltd., and joint-manager of the Newsprint Pool, stated that although Tasmanian newsprint mills are saving Australian publishers approximately $1,584,000 a year, and within the next four or five years may even double or treble the saving, Australia can never be self-sufficient in newsprint production owning to insufficient forest resources

Kaolin Corporation N. L., Adelaide, proposes to offer shareholders 40,000 new shares of five shillings ($1.20 at par) each. Merger of interests with Industrial Metals N.L. is to be made, name of the joint venture to be Australian Industrial Minerals, N.L. The chairman (Mr. K. Telfer) states that the paper industry is showing an encouraging interest in the firm's activities, and bulk shipments of kaolin have already been delivered.

Abrams Cites Lignin As Vanillin Source

MERRILL, Wis.—New uses of waste materials are discussed by Allen Abrams, vice-president of Marathon Corporation in charge of the research and chemical division, in an interview with M. N. Taylor, executive director of Trees for Tomorrow, Inc., in the organization's monthly publication.

Nearly half of the nation's supply of vanillin has its source in lignin material made by Marathon at its Rothschild plant, the article says. The finished product, used as a flavoring, is manufactured by the Salvo Chemical Corporation at Rothschild, a subsidiary of Sterling Drug.

Marathon's 15 years of research has resulted in processes for making vanillin, tanning materials, dispersing agents, boiler compounds and plastics from waste lignin.

Mr. Abrams also discussed improved stream conditions as the result of the processes, and many other uses of the recovered waste. The article predicts that simpler and more economical methods in the manufacture of pulp will be developed and that by-products will be improved as knowledge increases concerning the composition of lignin.

New Gary Mill Will Use Sterling Process

GARY, Ind.—The Gary Paper Mill, Inc., has been organized to build a new modern paper mill to produce newsprint by the Sterling pulp process. The mill will produce 50 tons a day at the start.

John R. Snyder of Gary is president and Ward Just of Waukegan, Illinois, is secretary and treasurer. The mill is entirely owned by a group of publishers.

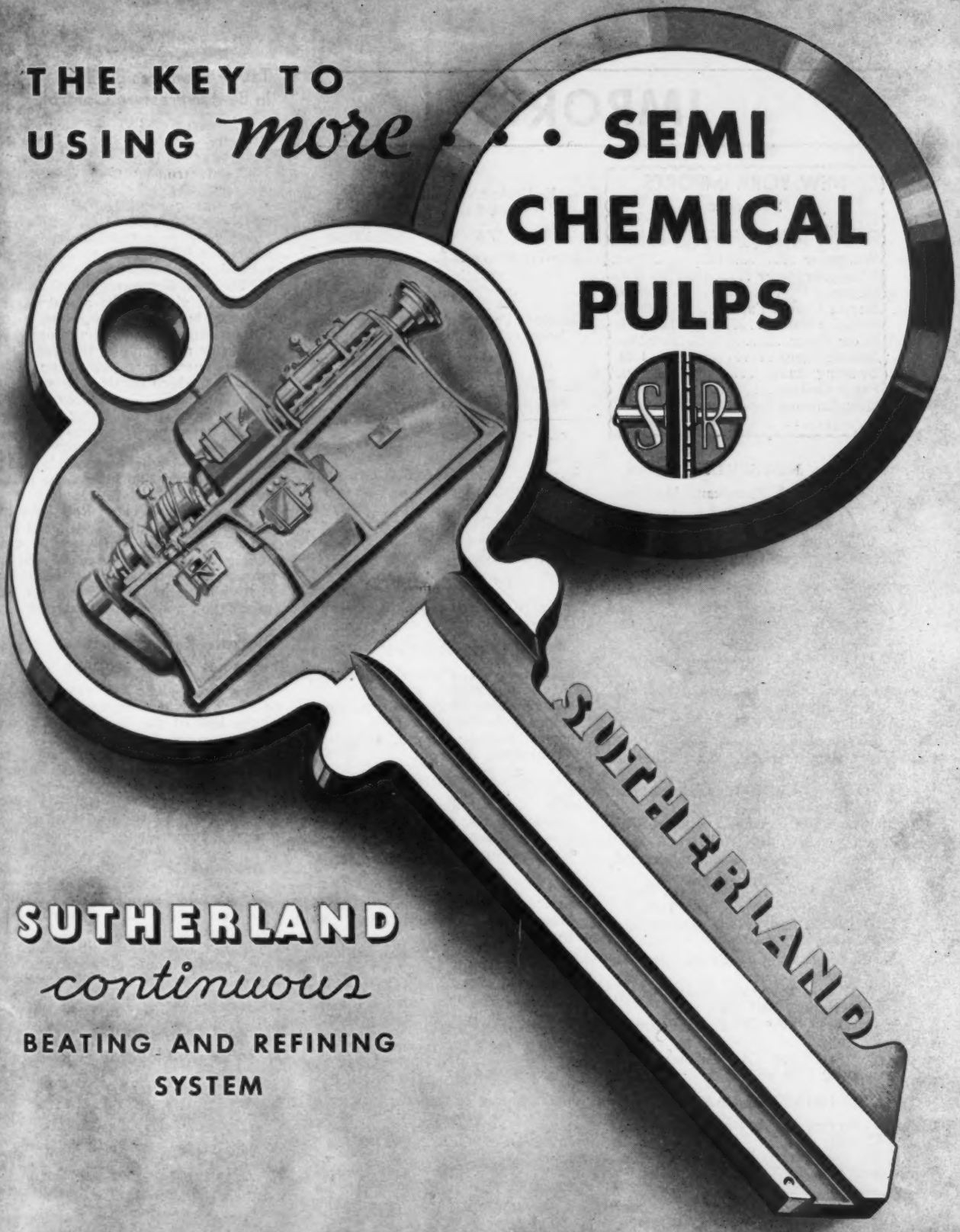
The American Industrial Company, 68 Main Street, Buffalo, will build and equip the new mill. Orders have already been placed for a part of the machinery.

This will be the first modern mill built to produce newsprint from waste news by the Sterling pulp process. Several other groups and mills have applied for a license to use this process both in the United States and foreign countries.

Link-Belt Promotes Midwest Executives

CHICAGO—James B. Elliott, formerly divisional manager for the Caldwell plant products of the Link-Belt Company, has recently been appointed divisional sales manager of that company's Minneapolis plant. Erwin A. Wendell has been named divisional sales manager for Caldwell plant products in the Chicago office and T. W. Matchett has been appointed district sales manager of the Chicago branch of these important suppliers to the paper trade, succeeding Mr. Wendell.

THE KEY TO
USING *more* . . . SEMI
CHEMICAL
PULPS



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SUTHERLAND REFINER LIMITED, 319 DRUMMOND BLDG., MONTREAL, P.Q., Manufactured in Canada By The John Bertram & Sons Co. Ltd., Dundas, Ontario

IMPORTS

NEW YORK IMPORTS

SUMMARY

Newsprint	27,502 rolls
Printing Paper	72 cs., 42 rolls
Wallpaper	5 cs.
Wrapping Paper	1143 rolls
Gummed Paper	65 cs.
Baryta Coated Paper	26 cs.
Sulphite Paper	118 rolls
Filter Paper	32 cs.
Marble Paper	1 cs.
Drawing Paper	5 cs.
Paper Doilies	15 cs.
Miscellaneous Paper	1 pkg., 462 rolls

NEWSPRINT

N. Y. Journal American, Markland, Liverpool, 588 rolls.
N. Y. Tribune, Markland, Liverpool, 1743 rolls.
N. Y. World Telegram, Markland, Liverpool, 545 rolls.
Brooklyn Eagle, Inc., Markland, Liverpool, 701 rolls.
Herald Statesman, Inc., Markland, Liverpool, 42 rolls.
Washington Post, Markland, Liverpool, 2604 rolls.
Alexandria Gazette, Markland, Liverpool, 27 rolls.
Washington Daily News, Markland, Liverpool, 334 rolls.
News Syndicate Co., Kay, Thorold, 2057 rolls.
H. G. Craig Co., Kermic, Donnacona, 353 rolls.
Montmorency Paper Co., Empire Caicos, Botwood, 4761 rolls.
(———), Empire Caicos, Botwood, 1459 rolls.
Journal Gazette (Fort Wayne, Ind.), Veendam, Rotterdam, 266 rolls.
R. A. Olsen, Inc., G.D.D., Donnacona, 388 rolls.
News Syndicate Co., Brian, Thorold, 1968 rolls.
N. Y. World Telegram, Stuart Prince, Cornerbrook, 1901 rolls.
R. A. Olsen, Inc., G.T.D., Donnacona, 374 rolls.
News Syndicate Co., Colabee, Baie Comeau, 7391 rolls.

PRINTING PAPER

F. C. Strype, Andyk, Rotterdam, 70 cs., 42 rolls.
S. H. Pomerance, Port Sydney, London, 2 cs.

WALLPAPER

All Transport, Inc., De Grasse, Havre, 5 cs.

WRAPPING PAPER

The Borregaard Co., Inc., Gripsholm, Gothenburg, 1031 rolls.
National City Bank, Gripsholm, Gothenburg, 112 rolls.

GUMMED PAPER

B. F. Drakenfeld & Co., Fort Cadotte, Liverpool, 65 cs.

BARYTA COATED PAPER

Lep Transport, Inc., Port Syndey, London, 26 cs.

SULPHITE PAPER

Resolute Paper Products Corp., Gripsholm, Gothenburg, 118 rolls.

FILTER PAPER

H. Reeve Angel & Co., Inc., Port Sydney, 27 cs.
(———), Gripsholm, Gothenburg, 5 cs.

MARBLE PAPER

Stevens Nelson Paper Co., Gripsholm, Gothenburg, 1 cs.

DRAWING PAPER

H. Reeve Angel & Co., Inc., Port Sydney, London, 5 cs.

PAPER DOILIES

American Express Co., American Ranger, London, 15 cs.

MISCELLANEOUS PAPER

R. H. Macy Co., Parkersburg Victory, Antwerp, 1 pkge.
Resolute Paper Products Corp., Gripsholm, Gothenburg, 125 rolls.
Thomas Barrett & Son, Gripsholm, Gothenburg, 337 rolls.

RAGS, BAGGINGS, ETC.

Grace National Bank, Port Sydney, London, 6 bls. paperstock.
(———), Port Sydney, London, 18 bls. paperstock, 88 bls. rags.

CASEIN

American Cyanamid & Chemical Corp., Mormacdawn, Buenos Aires, 834 bags.
Paul A. Dunkel, Mormacdawn, Buenos Aires, 1250 bags.
Casein Co. of America, Div. of The Borden Co., Mormacdawn, Buenos Aires, 1000 bags (ground lactic).
Hercules Powder Co., Mormacdawn, Buenos Aires, 4000 bags.

HIDECUTTINGS

John Gorvers, Santa Clara, Barranquilla, 5950 bags.

WOODPULP BOARDS

Absorbo Beer Pad Co., Skagway Victory, Trieste, 240 bls.

NORFOLK IMPORTS

E. J. Keller Co., Inc., Notre Dame Victory, Antwerp, 62 bls. old bagging.

BOSTON IMPORTS

Gottesman & Co., Inc., Rydboholm, Gothenburg, 1424 bls unbleached kraft pulp.

Taylor Produces Bulletin In Beater Pressure Control

ROCHESTER, N. Y. — "Beater Roll Pressure Control Systems," a new eight-page bulletin just released by Taylor Instrument Companies tells a story, complete with charts and graphs, of how instruments help eliminate excessive roll pressure, reduce beating time, increase production, and save power. It is designed to be specially valuable for beatermen.

This new literature describes, with the aid of photographs and drawings, two main methods of controlling beater roll pressure. One system shows how the beater roll pressure is recorded so that the operator can adjust the roll to a position, which for the consistency of each "furnish" produces the required roll pressure. The other system is completely automatic. It controls the time and beater roll pressure according to a predetermined schedule and also automatically raises and lowers the beater roll.

These Taylor Beater Roll Pressure Control Systems, described in the bulletin, are the result of years of continuing research. The material and information collected over this period has been collated in this bulletin for the information and use by beaterman.

Flintkote Report Wins Financial World Trophy

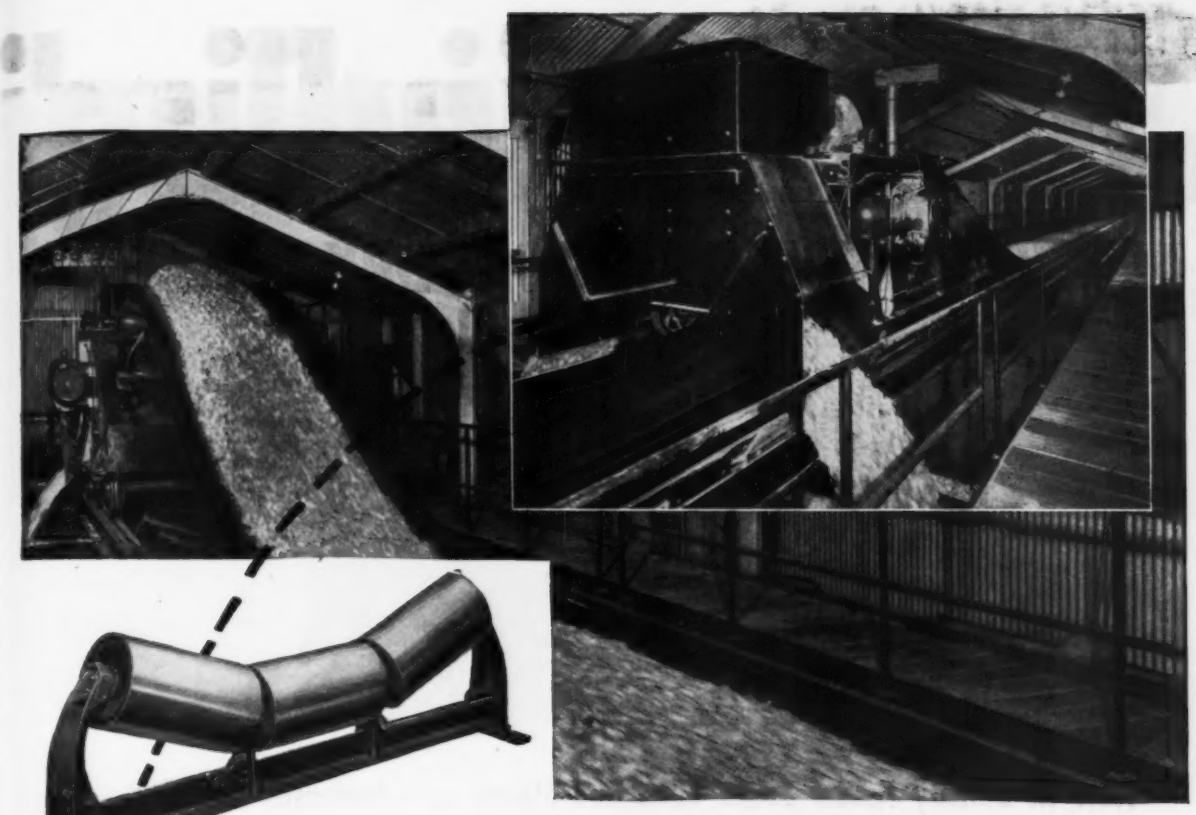
NEW YORK—The 1946 annual report of The Flintkote Company was judged as the best of the Building Materials industry in the final considerations of the Independent Board of Judges in the Financial World Annual Report Survey. The bronze "Oscar of Industry" trophy will be formally presented to I. J. Harvey, Jr., president of the company, at the Annual Report Awards Banquet by Weston Smith in the Grand Ballroom of the Hotel Pennsylvania in New York on Friday, October 10th. In this industrial classification National Gypsum Company was runner-up for the "Best of Industry" award, while Masonite Corporation came in third. A year ago Masonite Corporation won the oscar for the best 1945 annual report.

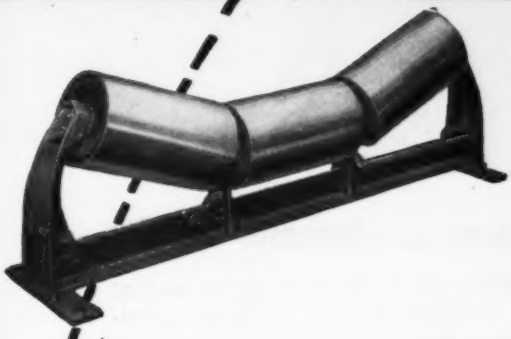
Ten Old-Timers Retire At Whitney-Plover

STEVENS POINT, Wis.—Ten employes of the Whiting-Plover Paper Company, with a total of 299 years of service, retired last week. Peter Nagorski had the longest service—45 years, and Ernst A. Viertel was the oldest at 76. He served 35 years.

Others in the group: George L. Dennison, 29 years; John G. Persike, 30; Frank Pike, 26; Martin Swancowski, 26; Anna R. Domka, 34; Mary C. Hoppa, 22; Verona V. Schuda, 23; and Emil Herman, 29.

The company has not had a retirement plan up to now, but is contributing a monthly sum at present to augment social security benefits.





LINK-BELT provides *a Quick Trip for Every Chip!*

L-B BELT TRIPPER PLACES HUGE VOLUME OF CHIPS IN STORAGE AT SOUNDVIEW

Link-Belt troughing idlers and return idlers with sealed roller bearings engineered and manufactured by Link-Belt, provide long life, trouble-free, low-cost operation in this simple, widely-used form of conveyor.

Traveling 550 F.P.M., this 60 inch belt carries 72,000 cubic feet of wood chips over the Link-Belt tripper, and into the storage bin every hour. At the same time, the tripper moves about 30 F.P.M., distributing the chips along the length of the bin. Reversing switches at either end make this movement entirely automatic, though a platform on the tripper permits an operator to ride on it if desired.

This device is the most recent Link-Belt installation in Soundview Pulp Co., the world's largest sulphite pulp plant, where numerous other belt conveyors, riding on Link-Belt roller bearing idlers, integrate the various stages in the process of converting wood chips into paper pulp.

LINK-BELT COMPANY

Chicago 9, Indianapolis 6, Philadelphia 40, Atlanta, Dallas 1, Minneapolis 5, San Francisco 24, Los Angeles 33, Seattle 4, Toronto 8. Offices in Principal Cities.

10,468

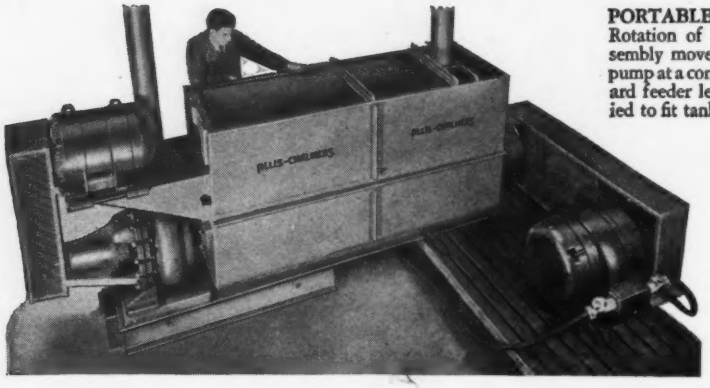
LINK-BELT

BELT CONVEYOR EQUIPMENT

IDLERS • TRIPPERS • BELTS • PULLEYS • BEARINGS • DRIVES

No Air Binding

. . . EVEN PUMPING 8% BONE-DRY PULPS!



PORTABLE EXPERIMENTAL UNIT. Rotation of shaft and multiple vane assembly moves pulp into suction of stock pump at a continuous, uniform rate. Standard feeder length of 62 inches can be varied to fit tank suited to your requirements.

New Hi-Density Feeder Saves Time and Steam . . . Increases Capacity

NOW — MOVE CHEMICAL PULPS up to 8 percent consistence continuously and uniformly . . . with *no interruptions* due to air binding! New Hi-Density Feeder, used with an Allis-Chalmers paper stock pump, offers big savings in stock handling, soda, sulphite and sulphate bleaching operations.

You save steam and storage space. As much as 50 percent less steam is required, depending on the proportionate increase in pulp consistence. And the Hi-Density Feeder can make it possible to *more than double* the storage capacity of your existing tanks and bleach plant reactors! Much less water is required to move a given volume of stock.

The Hi-Density Feeder eliminates the need of dilution for normal pumping . . . can even eliminate deckers. When used for pulp handling, it can entirely eliminate the use of wet lap for increasing beater capacities.

Yes, this new Allis-Chalmers product pays off profitably right from the day it's installed . . . in *reduced* operating costs and *increased* production. One installation successfully handles sulphite pulp of 9.7 percent consistence!

Get complete details about the new Hi-Density Feeder from the A-C office nearest you. Or write for bulletin 08B6725. ALLIS-CHALMERS, MILWAUKEE 1, WISCONSIN.

CHECK THESE DESIGN FEATURES

☐ Simple arrangement permits variable vane pitch settings for handling various products.

☐ Adjustable vane positioning clamps lock vanes securely to shaft.

☐ Counterweight provides balance of complete vane and clamp assembly.

☐ Plastic guide bearing is of split construction . . . allows for replacement without dismantling vane and bearing assembly. Does not require outside source of lubrication.

☐ Complete rotating element mounted on rubber cushioning pads.

. . . AND THESE CONSTRUCTION FEATURES

☐ All feeder parts contacting pulps are made of stainless steel to prevent rust discoloration.

☐ Renewable sleeve, made of special wear-resistant alloy, protects shaft at stuffing box.

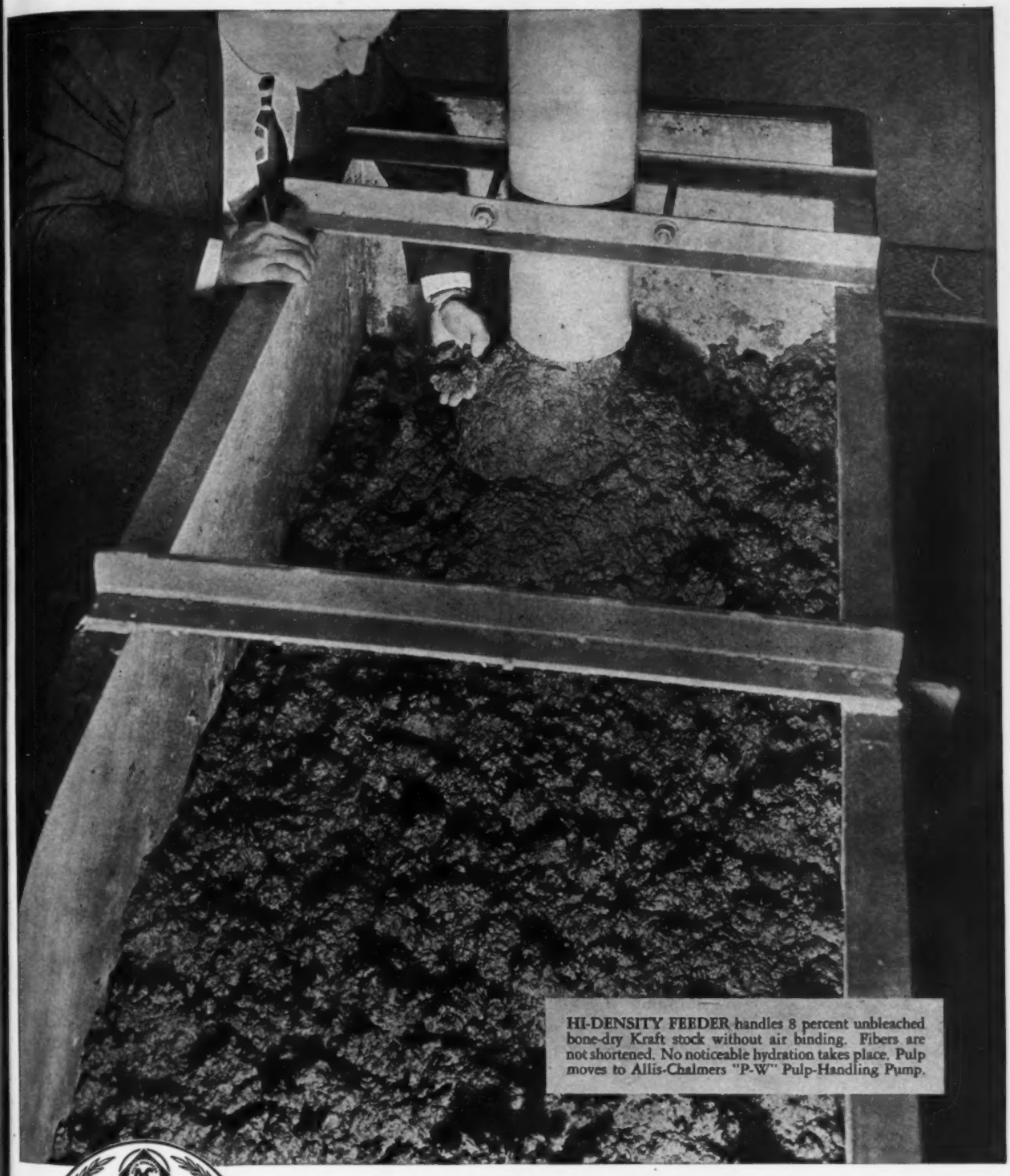
☐ Excessive shaft wear prevented by six rings of soft asbestos packing in stuffing box, with seal cage.

☐ Two oversize bearings are of anti-friction type.

☐ Neoprene seals keep dirt and water from bearings. A 2190

ALLIS-CHALMERS

One of the Big 3 in Electric Power Equipment — Biggest of All in Range of Industrial Products



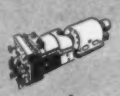
HI-DENSITY FEEDER handles 8 percent unbleached bone-dry Kraft stock without air binding. Fibers are not shortened. No noticeable hydration takes place. Pulp moves to Allis-Chalmers "P-W" Pulp-Handling Pump.

1847 1947
A CENTURY OF SERVICE
to Industry
THAT MADE
America Great

PREPARATION—Hydraulic Barkers, Chip Screens, Saws, Slashers.

COOKING—Digesters, Blow Tanks, Kilns, Heat Exchangers.

WET ROOM—Vibrating Screens for use as Thickeners, etc.



POWER—Generation, Distribution and Control equipment.

TEXROPE V-Belt drives to 5000 hp. Motors—all types a-c and d-c.

PUMPS—Single and Multi-Stage to 150,000 gpm—Stock pumps.

Biggest wonder in the house...

a home freezer with Panelyte

Other miracles are dwarfed by it!

What's electric light — compared with fresh cherry pie in January? What's television — as against plump oysters in August, or that Mallard you shot last Fall, coming up, succulent and tempting, weeks and months later?

That's only a whisper of the gustatory delights people know — when they have a home freezer. And most home freezing units — like most mechanical refrigerators — put their faith in Panelyte. That's the extremely light, extremely strong plastic made by St. Regis Paper Company. It's amazing what insulating power you get from these sheets of fibrous paper impregnated with synthetic resin and hot pressed.

There's even a Decorative Panelyte too, in attractive colors and patterns, for the tops of kitchen cabinets, tables, bars, trays and other working surfaces.

Panelyte—like all St. Regis products—is at present in such demand that even our steadily growing facilities are greatly taxed. In its 43 plants throughout North and South America, St. Regis also manufactures heavy-duty multiwall paper bags for shipping over 400 products; automatic bag filling machines; printing, publication and specialty papers; "Tacoma" bleached and unbleached sulphate pulp.

ST. REGIS PAPER *Company*

230 PARK AVENUE, NEW YORK 17, N. Y.

St. Regis Products are sold by St. Regis Sales Corporation: Offices in New York • Chicago • Baltimore • San Francisco and 20 other industrial centers.

IN CANADA: St. Regis Paper Co. (Can.) Ltd., Montreal

ST. REGIS PRODUCTS ARE FASHIONED FROM GROWING TREES TO SERVE ESSENTIAL INDUSTRIES

UNKNOWN UNTIL RECENTLY....."CHAMP" TODAY

Unknown until announced in the journals as recently as January, 1947—today a thoroughly proved and widely accepted veteran. That's the whirlwind speed with which Orr-Chem felts have won the confidence of the industry. New things seldom "click" so quickly.

The explanation traces directly to performance. These new treated felts go on the machine easier and set to it more readily, give excellent drainage, are subject to less shrinkage, stretch, or blowing.

Most important of all, and also appealing to machine crews, as well as to management, is the substantially longer wear and marked reduction per ton in felt costs.

Practically all grades, all types of machines, are represented. Top and bottom felts, press and suction felts are represented. Every weave and texture is represented.

In the interest of felt performance and resulting economies, wouldn't you like to try the new product that won the confidence of the industry so quickly? What kind and what size will you require?

ORR-CHEM

THE ORR FELT & BLANKET CO., PIQUA, OHIO

TRENDS

Office of the PAPER TRADE JOURNAL,
Wednesday, September 10, 1947.

Paper converters report getting more paper and paperboard in relative proportion to increased paper mill production over the past several months. However, in the majority of cases, converters as well as wholesale distributors have not been able to re-establish normal inventory ratios to output or sales because of sustained pressure of demand from their customers. Thus, even as paper supplies have increased they are still not enough to meet all demands and satisfactorily replenish inventories. The prevailing high level of business activity as reflected in the pressure of converters, distributors, and consumers of paper generally to procure sufficient supplies and even to look ahead a few months is said to have led one observer to state recently that "at the worst, paper demand could recede to a boom!" Considering the fact that 1947 paper and board production is likely to surpass 21,000,000 tons, which is 7,500,000 tons, or 55 percent greater than in 1939, it is understandable why the current level of demand seems so stratospheric to some paper industry observers as to apparently never to be satisfied. Reports from the Department of Commerce field offices state that the supply-demand situation is confused by the fact that many users of paper are still employing substitute grades, thus using types of paper which would normally be used in some other kind of business. This condition tends to increase prices since the substitute paper is usually of a more expensive grade than that ordinarily used and this cost is passed on to the consumer. For example, many butchers are using locker paper and other types which are higher priced than butchers' wrap. Meanwhile, wholesalers state that if supplies of paper were available their over-all sales could be increased substantially, but even at the present rate their sales volume is at the highest level in history.

The index of general business activity for the week ended August 30 declined to 143.2 from 144.3 in the preceding week, compared with 136.2 for the corresponding week in 1946. The index of paperboard production declined to 168.1 from 172.5 in the previous week, compared with 164.8 for the corresponding week in 1946.

Paper production for the week ended August 30 was estimated at 102.7 percent, compared with 103.7 for the preceding week, with 105.6 for the corresponding week in 1946, with 95.2 for 1945, with 89.4 for 1944, and with 90.7 percent for the corresponding week in 1943.

Paperboard production for the week ended August 30 was 99.0 percent of capacity, compared with 100.0 percent for the preceding week, with 100.0 for the corresponding week in 1946, with 97.0 for 1945, with 97.0 for 1944, and with 97.0 percent for the corresponding week in 1943.

Paper and pulp mills throughout the country, with relatively few exceptions, continue to receive pulpwood in quantities adequate to support their sustained high level of production, according to recent reports of the Commerce Department's regional offices. A departure from the generally satisfactory position has been noted in sections of the New England region where instances of lower pulpwood supply are attributed to difficulties in maintaining a sufficient labor force. That these conditions are isolated and limited perhaps to mills in the northern part of the region is indicated by the over-all supply statistics of the New England states, which reveal improvements in both receipts and inventories of pulpwood. Some mills in that area are utilizing wood as rapidly as they acquire it. In the Pacific Northwest, pulpwood stocks are no longer a matter of grave concern to the industry. Log inventories on hand at paper and pulp mills on the Columbia and Willamette Rivers on July 1 were 14.4 million board feet greater than on June 1, nearly all the advance being in hemlock and spruce. Latest reports from the South reflect an adequacy of pulpwood in that important region.

The majority of paper wholesalers interviewed by Commerce Department field offices report that at least their strictly current sales could be increased substantially, in some cases even as much as 25 percent, if adequate paper were available to meet all demands of their customers. Dollar inventories of approximately 70 wholesalers in paper and allied products at the end of June 1947 amounted to $4,296,000, compared with $3,272,000 at the end of June 1946, a gain of 30 percent in terms of value. Most of this apparent gain, however, probably is accounted for by price increases. The Bureau of Labor Statistics reports average paper prices to be about 27 percent higher at the end of June of this year than in June 1946. Thus, the volume gain in distributors' inventory over 1946 appears to be relatively small. . . . In similar comparison, sales of 70 wholesalers amounted to $56,517,000 in the first half of 1947, against $49,720,000 in the first six months of 1946, an increase of 23 percent over the first half of 1946. These comparative statistics would appear to indicate, volumewise, wholesalers' sales were even less in 1947 than in 1946. This is not, however, the actual situation because, in the first half of 1946, paper wholesales were constrained to sell high-grade and high-priced paper instead of the lower-grade and lower-priced paper desired by customers. This year, wholesalers have been better able to meet their customers' needs, which means that their sales in dollars per ton are proportionately less than a year ago. . . . In general paper wholesalers are believed to have received the same relative volume increase in supplies as produced, since most paper mills have allocated output to established customers equitably. Thus, on the average, paper wholesalers' sales in the first six months of this year have probably increased in volume by about 10 percent over the corresponding period of 1946.

Wood Pulp

Finnish exports of wood pulp to the United States in July alone almost equaled the total tonnage shipped during the first six months of the year, according to figures released by the Finnish Foreign Trade Association. Nevertheless, in bidding for Finnish wood pulp, United States buyers are said to have experienced severe competition, particularly from those of France and Britain. The Finnish capital is said to be teeming with agents from these countries offering handsome premiums over and above the stipulated prices to Finnish mills still having something to sell. Wood pulp shipments for July totaled 52,000 tons compared with 60,000 tons for the first six months.

Meanwhile, total production of domestic wood pulp for the first half of 1947 was at a rate approximately 15 percent over a year ago. Should the remainder of the current year maintain the same relation to the year's total as did the last six months of 1946, the total domestic output of pulp is likely to exceed the most liberal earlier estimates of industry and Government, and might possibly achieve a year's aggregate of more than 12 million tons.

Waste Paper

Paper mills are expected to demand about 60,000 tons more waste paper during each of the next four months than they have been receiving. This is nationwide for all the consuming mills. Estimates are based upon an increase of 15 percent in the consumption of waste paper during the first 33 weeks of this year over the same period of 1946, together with indications of mills' production programs for the final third of the year.

Some dealers are still unable to supply enough stock to meet consumption requirements in any of the bulky grades of waste paper. Waste paper quotations continue strong with No. 1 hard white envelope cuts, one cut, leading the way at about $135 per ton f.o.b. baled New York.

Attention, Mills!

Look ahead...

...Keep ahead with...

The La Boiteaux COMPANY

The La Boiteaux Company has given new significance to these words by broadening and intensifying its services to the paper and paperboard industries.

In addition to our leadership as distributors of box board, paper and paperboard specialties, we offer a complete coast-to-coast sales network, *plus* a world-wide outlet thru our export department.

Irrespective of the tonnage or grades you produce . . . you can profit through the continued use of La Boiteaux sales assistance and distribution. Today, more than ever before, it's essential to "Look Ahead . . . Keep Ahead . . . with The La Boiteaux Company."

LARGEST DISTRIBUTOR OF BOXBOARD IN THE UNITED STATES

LaB Service

The La Boiteaux Company, Inc.

2985 MADISON ROAD, CINCINNATI 9, OHIO

NEW YORK • CLEVELAND • CHICAGO • SAN FRANCISCO

Cable Address: LABCO

New Quebec Alcohol Plant to Use Gatineau Waste Sulphite

TORONTO — Waste sulphite liquor from Canadian International Paper Company's Gatineau mill on the Quebec side of the Ottawa River, about five miles below Ottawa, will be utilized by a new distillery costing $2.5 million to make commercial alcohol. The new alcohol plant will be the world's largest, it is claimed, and will produce 2 million imperial gallons of ethyl alcohol annually.

Commercial Alcohols, Ltd., is planning the development, which, according to Vice-President and General Manager H. C. Kerman, will have the largest capacity of any sulphite liquor distillery in the world. There are said to be only two other similar plants in North America — one in the United States with a capacity of about 1,750,000 imperial gallons yearly, the other in connection with Ontario Paper Company's plant at Thorold, Ont.

Whitney Joins W. C. Hamilton

MIQUON, Pa. — Creighton W. Whiting has joined W. C. Hamilton & Sons organization as a specialist in the sale of blue print and direct process papers. Mr. Whiting was formerly connected with the American Writing Paper Company in the same capacity.

Let this NAME be YOUR GUIDE
to the Best in Rubber Covered Rolls

To more than 150 important paper mills, the name CINCINNATI stands for the best in Rubber Covered Rolls. Such user-preference is the result of outstanding performance on machines producing all kinds of paper . . . preference that promotes a "once a Cincinnati user — always a Cincinnati user" attitude.

Send your next roll to CINCINNATI for recovering.

THE CINCINNATI RUBBER MFG. CO.
CINCINNATI 12, OHIO

EVERYTHING in RUBBER for the PAPER INDUSTRY

British Rationing in Committee's Hands

WASHINGTON, D. C.—Details of the British Government's action reducing consumption of newsprint in the United Kingdom have been cabled to this country from American official sources at London.

In substance, this source stated;

A reduction in British newsprint consumption effective July 21, 1947, was ordered by the Government, following a vote on the measure in Commons July 17. The Administration of this order will be carried out by the Rationing Committee of the non-governmental Newsprint Supply Company, Ltd. The Committee will permit newspapers to effect reduction by reducing the number of copies or the number of pages or both.

The Government's position in regard to necessity for reducing newsprint consumption, and thereby imports, in order to conserve exchange, was supported in Commons by a vote of 2 to 1, nothwithstanding widespread and frequent criticism of the measure when it was pending. The press pointed out that the estimated saving of £1,000,000 in the next six months was but a slight fraction of the gap between value of imports and exports. The measure was severely criticized as endangering the future supply of newsprint from Canada.

Fears were expressed that it might prove difficult to reinstate orders at the Canadian mills should they be canceled or deliveries postponed. This view was advanced by the Newsprint Supply Company, Ltd., in a statement pointing out the difficulty encountered in placing long-term contracts with Canadian mills last year. The statement emphasized that North American supplies are vital to the Brtish press, since North America is the only source which can be considered as immune from military or political risk.

The Scandinavian wood pulp supply, upon which domestic newsprint manufacturers depend, was characterized as precarious and expensive. Furthermore, it must be purchased with hard currency. Canadian newsprint which is priced in the United Kingdom at £30 per long ton of 2,240 pounds is contrasted with domestic newsprint manufactured from Scandinavian wood pulp priced at £40 per ton.

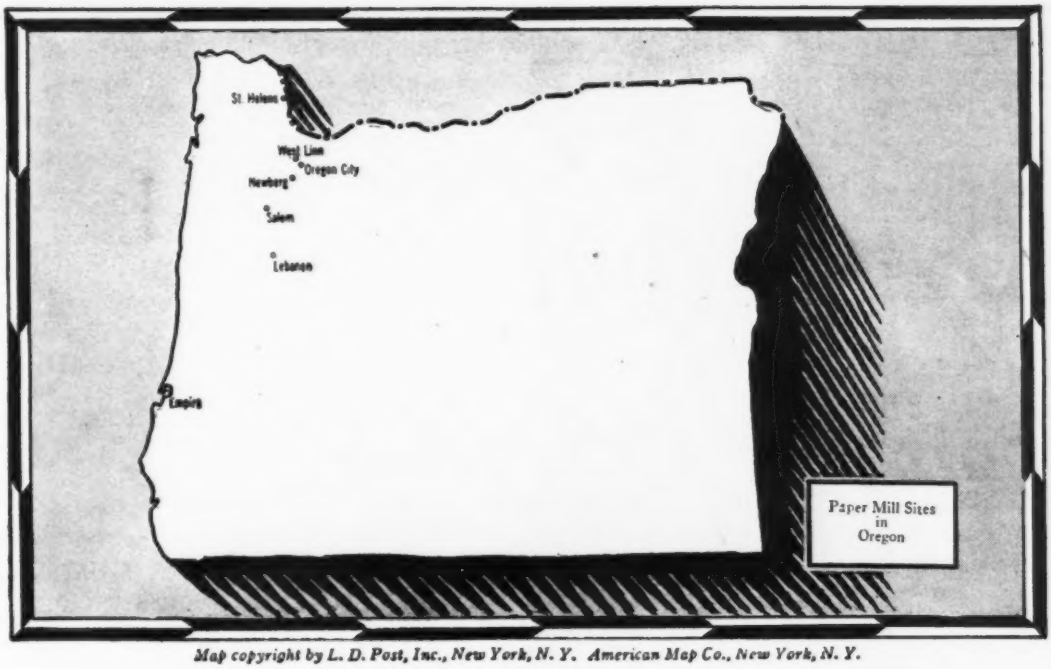
Stauntons Will Add To Wallpaper Plant

TORONTO—Staunton's, Ltd., wallpaper manufacturers in Leaside, a Toronto suburb, plans an addition to its plant to cost $300,000. It will be one story with full basement, 283 by 78 feet, reinforced concrete, clay tile and brick, with separate boiler house one story high and 40 feet square. Architects for the job are Mathers & Haldenby. The addition will increase manufacturing space one third and bring floor area to about 160,000 square feet.

Draper's

ATLAS OF AMERICAN PAPERMAKING

No. 35 PUBLISHED BY DRAPER BROTHERS COMPANY • CANTON, MASSACHUSETTS



Map copyright by L. D. Post, Inc., New York, N. Y. American Map Co., New York, N. Y.

HIGHLIGHTS: Oregon has made fast progress in pulp manufacture, especially. As recently as 1930 its production was listed in the U. S. Census reports only under the heading "All Other States." By 1936, it had risen to sixth in rank. As a papermaking State it ranks sixteenth — producing over 310,000 tons per annum.

Products include newsprint, mimeo, sulphite bond, greaseproof, glassine, bristol, kraft, fruit wraps, waxed paper, wrapping paper and insulating board.

Equipment includes 21 Fourdriniers and one cylinder machine, 82 wood grinders, 23 sulphite and 4 sulphate digestors.

Draper Felts for Efficiency

DRAPER BROTHERS COMPANY

Woolen Manufacturers Since 1856

Canton, Massachusetts

RALPH E. BRIGGS Sales Manager

BRADFORD WEST, PITTSFIELD, MASS. — WILLIAM N. CONNOR, Jr., CANTON, MASS. — L. H. BREYFOGLE, KALAMAZOO, MICH. — WALTER A. SALMONSON, 519-20 WHITE BLDG., SEATTLE, WASH. — L. L. GRIFFITHS, Jr., KALAMAZOO, MICH.

PRICES

With the elimination of price controls on paper, pulp, rags and other materials, the quotations given below once more become indicative of trends in an open market. At the moment they can be of little more, for, while some volume business still is being done under contract at the figures given below, fluctuations representing special conditions are too varied and too frequent to permit prices to be given as representing a wholly stabilized market.

Paper

(Delivered New York)

Standard News, per ton—

Roll, contract	$87.50	to	$90.00
Sheets	$109.00	"	—

Kraft—per cwt.—Carload Quantities

Zone A, Delivered 40 lb. base weight

Superstandard Wrapping	$7.00	to	—
No. 1 Wrapping	6.50	"	6.75
Standard Wrapping	6.00	"	6.25
Standard Bag	5.75	"	6.25

Tissues—Per Ream 24x36 (480) 10 lb. Zone 1.

Wh. No. 1 Frd.	$1.65	to	$1.72
Wh. No. 1 M. G.	1.65	"	1.72
Wh. No. 1½	1.48	"	—
Wh. No. 2	1.55	"	—
Kraft Anti-Tar	1.38½	"	—
Kraft Unbl.	1.85	"	—
Manila No. 2	1.62	"	—

Toilet—Per Case of 100 rolls—1 M Sheets.

Unbleached	$5.50	to	$6.40
Bleached	6.50	"	7.60

Paper Towels—Per Case of 3750—

Zone 1.

Wh. Jr. M'tif'd 9¼x9½	$4.85
Br. Sr. M'tif'd 10x12	3.45
Br. Jr. M'tif'd 9½x9¾	2.95
Br. Jr. Sgl. fold 10x10¾	3.10

Manila—per cwt.—C. l. f. a.

No. 1 Jute Tag	$13.80
Reg. Jute Manila	13.25
No. 1 Manila	9.75

Boards, per ton—

News	$92.50	"	—
Chip	90.00	"	—
Sgl. Mla. L1 Chip*	102.50	"	—
White Pat. Coated*	120.00	"	—
Kraft Liners 42 lb.	95.00	"	—
Binders Boards	126.00	"	—

* Base Prices per 10 tons. Less than 10 tons but over 3 tons, add $2.50; three tons or less, add $5; regular 35-39 basis, add $5; basis 40-49, add $2.50; basis 91-100, add $2.50; basis 101-120, add $5.

The following prices are representative of distributors' resale prices, all deliveries in Zone 1: Rag Content Bonds and Ledgers—

White, Assorted Items

Bonds, per cwt.

	Carton	4 C't'n	Ton
100% Rag Ext. No. 1	$55.00	$50.00	$48.00
100% Rag	46.50	43.00	41.25
75% Rag	35.00	32.50	31.50
50% Rag	31.50	28.75	27.50
25% Rag	28.00	25.50	24.50

Ledgers, per cwt.

100% Rag Ext No. 1	$54.25	$50.00	$48.00
100% Rag	46.25	42.50	40.75
75% Rag	36.00	33.25	31.75
50% Rag	31.00	28.00	27.00
25% Rag	27.25	24.75	23.75

Sulphite Bonds and Ledgers—White, Assorted Items

Bonds, per cwt.

No. 1	$19.25	$17.50	$16.80
No. 2	18.25	16.50	16.00
No. 4	16.75	15.25	14.50

Ledgers, per cwt.

No. 1	$20.25	$18.35	$18.60
No. 2	19.25	17.50	16.80
No. 4	17.75	16.25	15.50

Free Sheet Book Papers—White, Cased Paper

(Per cwt.)	Case	Ton
No. 1 Glossy Coated	$19.40	$18.60
No. 2 Glossy Coated	18.15	17.35
No. 3 Glossy Coated	17.65	17.00

(Per cwt.)	Case	Ton
No. 1 Antique (Water marked)	$15.90	$15.25
No. 2 Offset	16.00	14.75
A Grade E. F.	13.90	13.30
A Grade S. & S. C.	14.40	13.70
B Grade E. F.	Nominal	
B Grade S. C.	Nominal	
C Grade E. F.	Nominal	
C Grade S. C.	Nominal	
D Grade E. F.	Nominal	
D Grade S. & S. C.	Nominal	

Wood Pulp

Domestic mill prices delivered with former OPA freight allowances.

	Per Short ADT
Groundwood	$75.00 to $80.00
Unbleached Sulphite	115.00 " 117.00
Bleached Sulphite	121.00 " 125.00
Bleached Soda	115.00 " 120.00
Unbleached Kraft	112.50 " 120.00
Southern Kraft	90.00 " 102.50

Canadian mill Prices delivered with freight allowances unless otherwise specified:

	Per Short ADT
Select Unbleached Kraft (no freight allowance)	115.00 " —
Unbleached Sulphite	115.00 " 117.00
Bleached Sulphite	125.00 " 155.00
Glassine Unbleached Sulphite (no freight allowance)	112.00 " —
Bleached Soda	105.00 " 115.00
Groundwood	75.00 " 80.00
Sideruns Pulping News	75.00 " 80.00
Hardwood and Specialty Grades	Nominal

Swedish Quotations

Ex. dock, New York

	Per Short ADT
Bleached Kraft	$150.00 to 156.00
Bleached Sulphite	151.00 " 158.50
Unbleached Sulphite	121.00 " 131.00
Unbleached Kraft	116.00 " 126.00

Finnish Quotations

Ex. dock, New York

	Per Short ADT
Bleached Sulphite	$179.95
Unbleached Sulphite	140.45
Unbleached Sulphite (special grade)	145.75
Unbleached Sulphate	140.45
Unbleached Sulphate (special grade)	168.54

New Domestic Cotton Cuttings

(Prices delivered Mill Plus Dealer's Commission)

White Shirt	$11.50	to	$12.00
Light Silesias	7.50		
Unbleached Muslin	11.50	"	12.00
White Back Blue Overalls	8.50		
Blue Overalls	7.75		
Unbl. Fancy Shirt	5.00	"	5.50
Light Percales	6.00	"	6.50
Light Prints	5.25	"	5.95
Washables	4.00		
Bleachable Khaki	6.00	"	6.50
Unbleachable Khaki	5.50	"	6.00
Cottonades	5.00	"	5.50

Old Domestic Cotton Rags

(F.O.B. Shipping Point Plus Dealer's Commission)

	Per 100 lbs.
No. 1 Whites Repacked	$4.50
No. 1 Whites Miscellaneous	4.25
No. 2 Whites Repacked	4.00
No. 2 Whites Miscellaneous	3.50
Blue Overalls	3.75
Thirds and Blues Repacked	3.00
Thirds and Blues Miscellaneous	2.50
No. 1 Roofing Rags	1.65
No. 2 Roofing Rags	1.55
No. 3 Jute Bagging	1.45
No. 4 Brussels and hard back carpets	1.45
No. 5A Roofing Rags	1.45

New Foreign Cotton Cuttings

(Prices delivered Mill)

	Per 100 lbs.
New Dark Cuttings	$6.00 to —
New Mixed Cuttings	6.50 " —
Light Silesias	9.00 " 10.00
Light Flannelettes	8.00 " 9.00
New White Cuttings	13.00 " 15.00
Fancy Shirt Cuttings	9.00 " 10.00
Light Prints	8.00 " 10.00
Bleachable Khaki, No. 1	7.00 " 7.50
Unbl. Khaki, No. 1	6.25 " 6.75

Old Foreign Rags

(F.O.B. New York)

	Per 100 lbs.
No. 1 White Linens	$14.00 to 16.00
No. 2 White Linens	12.00 " 13.00
No. 3 White Linens	8.00 " 9.00
No. 4 White Linens	8.00 " 9.00
No. 1 White Cottons	10.00 " 12.00
No. 2 White Cottons	8.00 " 9.00
No. 3 White Cottons	6.50 " 7.00
No. 4 White Cottons	5.00 " 5.50
Extra Light Prints	7.50 " 8.00
No. 1 New Light Prints	6.25 " 6.75
Med. Light Prints	5.25 " 5.75
Dutch Blue Cottons	5.25 " 5.50
Checks and Blues	4.00 " 4.25
Linsey Garments	3.00 " 3.75
Dark Cottons	2.50 " 3.00
Old Shopperies	2.50 " 3.00
New Shopperies	2.50 " 3.00

Bagging

(Prices to Mill, f.o.b. N. Y.)

	Per 100 lbs.
Foreign Gunny, No. 1	$4.75 to 5.00
Domestic Gunny, No. 1	4.25 " 4.50
Light Wool Tares	4.50 " 4.75
Heavy Wool Tares	4.75 " 5.00
Bright Bagging	4.25 " 4.50
Foreign Manila Rope	6.00 " 7.00
Domestic Manila Rope	5.75 " 6.50
Jute Strings	4.50 " 5.00
No. 1 Sisal Strings	5.50 " 6.00
Mixed Strings	1.75 " 2.50

Waste Paper

Prices to Mills

(Dollars Per Ton)

F.o.b. New York, Baled

No. 1 Hard White Envelope Cuts, one cut	$125.00 to $135.00
No. 1 Hard White Envelope Cuts	110.00 " 120.00
No 1 Hard White Shavings, unruled	110.00 " 120.00
No. 1 Hard White Shavings, ruled	100.00 " 120.00
Soft White Shavings, one cut	110.00 " 120.00
No. 1 Soft White Shavings	90.00 " 100.00
Soft White Shavings, Misc.	80.00 " 90.00
No. 1 Fly Leaf Shavings	55.00 " 60.00
No. 2 Fly Leaf Shavings	50.00 " 55.00
No. 1 Groundwood Fly Leaf Shavings	30.00 " 33.00
No. 2 Mixed Groundwood Fly Leaf Shavings	(nominal)
Mixed Colored Shavings	(nominal)
Mixed Groundwood Colored Shavings	(nominal)
Overissue Magazines	(nominal)
No. 1 Heavy Books & Magazines	25.00 " 30.00
Mixed Books	15.00 " 20.00
No. 1 White Ledger	75.00 " 85.00
New Manila Envelope Cuttings, one cut	100.00 " 110.00
New Manila Envelope Cuttings	65.00 " 75.00
Extra Manilas	35.00 " 40.00
Mixed Kraft, Env. & Bag Cuttings	75.00 " 85.00
Kraft Envelope Cuttings	100.00 " 105.00
Triple Sorted, No. 1 Brown Soft Kraft	65.00 " 75.00
New 100% Kraft Corrugated Cuttings	75.00 " 85.00
No. 1 Assorted Old Kraft	40.00 " 50.00
New Jute Corrugated Cuttings	27.00 " —
Old 100% Kraft Corrugated Containers	(nominal)
No. 1 News	17.00 " 19.00
No. 1 Mixed Paper	15.00 " 17.00
Box Board Cuttings	16.00 " —
White Blank News	75.00 " 80.00
Overissue News	(nominal)
Old Corrugated	30.00 " 32.00
Mill Wrappers	22.00 " 25.00

Twines

All Prices Nominal

(F. o. b. Mill)

(Soft Fiber)

Coarse Polished—India	.26	@	.29
Fine Polished—Fine India	.31	"	.35
Unpolished—Paper Makers	.20	"	.26
Tube Rope	.22	"	.27½
Wrapping	.26	"	.33½
Cotton	.70	"	—
(Hard Fiber)			
Mex. Sisal	.21	"	.24
Manila	.33	"	—
(Hemp)			
Polished Hemp	.63	"	—

PHILADELPHIA

Domestic Rags (New)

(F.O.B. Eastern Shipping Point)

Shirt Cuttings—			
New White No. 1	.10½	@	.11
New White No. 2	nominal		
Light Silesias	.07½	"	.08
Black Silesias, soft	.06½	"	.07
New Unbleached	.10½	"	.11¼
Washable Prints	.06½	"	.07
Washable No. 1	.05	"	.05½
Blue Overall	.07½	"	.08
Cottons—According to grades—			
Washable Shredding	.03½	"	.04
Fancy Percales	.06¾	"	.07¼
New Black Soft	nominal		
Khaki Cuttings—			
Unbleachable Cotton Cuttings	.06	"	.06½
Bleachable Cotton Cuttings	.07	"	.07½
Men's Corduroy	.05¼	"	.06
Ladies' Corduroy	.05	"	.05¼
Cottonades	.05¼	"	.06

Domestic Rags (Old)

(F.O.B. Eastern Shipping Point)

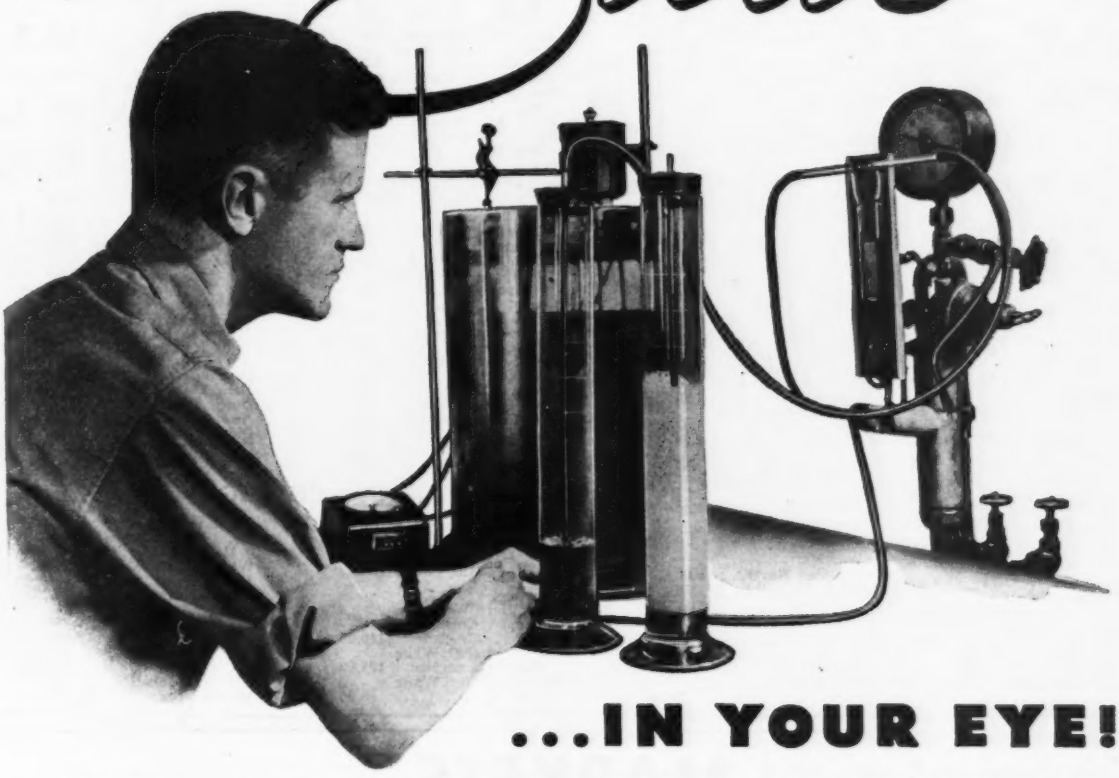
White No. 1—Repacked	4.50	@	5.00
Mixed White	4.00	"	4.25
White No. 2—Repacked	3.50	"	3.75
Thirds and Blues—			
Miscellaneous	2.25	"	2.50
Repacked	2.75	"	3.00
Roofing Stock—			
Foreign No. 1	nominal		
Domestic No. 1	1.70	"	1.75
Domestic No. 2	1.60	"	1.65
Roofing Bagging	1.50	"	1.65
Old Manila Rope	6.50	"	6.50

Bagging

(F.O.B. Eastern Shipping Point)

Gunny No. 1—			
Foreign	nominal		
Domestic	4.50	to	5.00
No. 1 Clean Bright—Sisal Strings	.04	"	.04½
No. 2 Clean Bright—Sisal Strings	.03	"	.03¼
Sisal Jute	.02¾	"	.03
Scrap—			
No. 1	4.00	"	4.50
No. 2	1.75	"	2.00

HERE'S *Suds* ...IN YOUR EYE!



The suds very much in your eye as you look at the photograph above is lubricating oil which foams badly and, if used in valuable equipment, constitutes a hazard to positive lubrication, which can increase maintenance costs.

At Sinclair Laboratories, skilled technicians, like the one shown above, study and test lubricating oils constantly for foaming characteristics. Through research in the study of additives, Sinclair provides anti-foam characteristics and assures positive lubricating film plus maximum heat dissipation for protection against wear and failure.

Through such painstaking research, Sinclair maintains production of lubricants of consistent high quality. Sinclair Laboratories and outstanding research are behind the dependable performance of all Sinclair Lubricants for Industry.

Sinclair Lubricants for the Power Plant

For Turbines:
SINTURLITE OILS

For Steam Cylinders:
SINCLAIR STEAM CYLINDER AND VALVE OILS

For Compressors:
RUBILENE OILS

For Ball and Roller Bearings:
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Lubricants for Industry

FINEST CRUDES + EXPERT RESEARCH and MANUFACTURING CONTROL = OUTSTANDING PERFORMANCE

Wool Tares, heavy	4.75	"	5.00
Burlap Cuttings	6.00	"	6.50

Old Papers

(F. o. b. Phila.)
Mill Prices, Baled

No. 1 Hard White Envelope Cuts, one cut	$100.00	@	$115.00
No. 1 Hard White Shavings, unruled	100.00	"	—
Soft White Shavings, one cut	90.00	"	95.00
White Blank News	60.00	"	65.00
Soft White Shavings	80.00	"	—
No. 1 White Ledger	80.00	"	85.00
Ledger, Colored	67.00	"	70.00
No. 1 Heavy Books & Magazines	30.00	"	32.00
Overissue Magazines	nominal		
New Manila Envelope Cuttings	80.00	"	—
No. 1 Assorted Old Kraft	60.00	"	65.00
No. 1 Mixed Paper	15.50	"	—
Box Board Cuttings	15.00	"	—
Kraft Corrugated Cuttings	100.00	"	—
Old Corrugated	30.00	"	35.00
Overissue News	30.00	"	—
No. 1 News	18.00	"	20.00

BOSTON

Old Papers

(F. o. b. Boston)
Mill Prices, Baled

No. 1 Hard White Shavings, unruled	7.00	@	8.00
No. 1 Hard White Shavings, ruled	7.00	"	8.00
Soft White Shavings, Misc.	6.25	"	6.50
No. 1 Fly Leaf Shavings	1.65	"	1.80
No. 2 Fly Leaf Shavings	2.00	"	—
No. 1 Groundwood Fly Leaf Shavings	1.25	"	—
No. 2 Groundwood Fly Leaf Shavings	1.25	"	1.50
Mixed Colored Shavings	2.50	"	2.75
New Manila Envelope Cuts, one cut	5.00	"	5.50
Hard White Envelope Cuts, one cut	3.37½	"	—
Triple Sorted No. 1 Brown Soft Kraft	3.50	"	3.75
Mixed Kraft Env. & Bag Cuttings	3.75	"	4.00
Kraft Envelope Cuttings	3.75	"	4.00
No. 1 Heavy Books & Magazines	2.50	"	2.60
New Manila Envelope Cuts, one cut	2.87½	"	—
New Manila Envelope Cuttings	2.65	"	—
White and Colored Tabulating Cards	4.25	"	4.50
Groundwood Tabulating Cards	1.35	"	—
White Blank News	1.65	"	—
No. 1 Assorted Old Kraft	3.50	"	—
No. 1 Mixed Paper	—	"	.95
Overissue News	1.50	"	1.75
Box Board Cuttings	.72½	"	—
New Corrugated Cuttings, Kraft	2.25	"	—
Old 100% Kraft Corrugated Containers	1.75	"	—
Old Corrugated Containers	1.50	"	—
Jute Corrugated Cuttings	1.07½	"	—
Paper Strings	2.25	"	2.50

Bagging

(F. o. b. Boston)

Gunny Bagging—			
Foreign	—	@	4.75
Domestic	—	"	4.75
Sisal Rope No. 1	6.00	"	—
Sisal Rope No. 2	5.50	"	—
Mixed Rope	5.25	"	—
Mixed Strings	2.00	"	2.50
Transmission Rope—			
Foreign	(nominal)		
Domestic	3.00	"	3.50
Manila Rope—			
Foreign	(nominal)		
Domestic	6.25	"	—
Soft Jute Rope	5.00	"	5.25
Jute Carpet Threads	6.00	"	—
Bleachery Burlap	8.50	"	9.00
Scrap Burlap—			
Foreign	—	"	4.75
Domestic	—	"	4.87½
South America	5.25	"	—
Wool Tares—			
Foreign	4.75	"	—
Domestic	4.75	"	—
Aust. Wool Pouches	5.00	"	5.25
New Zealand Wool Pouches	5.25	"	5.50
New Burlap Cuttings	6.00	"	6.50
Heavy Baling Bagging	5.25	"	5.75
Paper Mill Bagging	3.50	"	3.75
No. 1 Roofing Bagging	1.75	"	—

Domestic Rags (New)

(F. o. b. Boston)

Shirt Cuttings—			
New Light Prints	.08	@	—
Fancy Percales	.07½	"	.08
New White No. 1	.11	"	.11½
New Light Flannelettes	.08	"	.08½
Canton Flannels, Bleached	.10	"	.11
Underwear Cutters, Bleached	.10	"	.11
Underwear Cutters, Unbleached	.11	"	.12
Silesias No. 1	.08	"	.08½
New Black Silesias	.05	"	—
Red Cotton Cuttings	.05	"	—
Blue Overalls	.08½	"	.09
Soft Unbleached	.11	"	.12
Blue Cheviots	.08½	"	.09
Fancy	.06	"	—
Washable	.06	"	—
Khaki Cuttings	.06½	"	.07¼
Corduroy	.03½	"	—
Khaki Canvas	.06¼	"	.06½
B. V. D. Cuttings	.10½	"	.11½

Domestic Rags (Old)

(F. o. b. Boston)

White No. 1—			
Repacked	3.80	@	—
Miscellaneous	3.20	"	—
White No. 2—			
Miscellaneous	2.65	"	—
Twos and Blues, Repacked	2.20	"	—
Old Blue Overalls	2.25	"	2.50
Thirds and Blues, Repacked	2.20	"	—
Miscellaneous	1.80	"	—
Black Stockings	3.50	"	4.00
Roofing Stock—			
No. 1	2.00	"	
No. 2	1.75	"	2.00
No. 3	1.35	"	—
No. 4	1.35	"	—
No. 5, Quality A	1.35	"	—
Quality B	1.20	"	—
Quality C	.95	"	—
Old Manila Rope	6.00	"	—

Foreign Rags

(F. o. b. Boston)

Canvas	(nominal)
Dark Cottons	(nominal)
Dutch Blues	(nominal)
New Checks and Blues	(nominal)
Old Fustians	(nominal)
Old Linsey Garments	(nominal)
New Silesias	(nominal)

CHICAGO

Waste Paper

(F. o. b. Chicago)
Mill Prices, Baled

Shavings—			
No. 1 Hard White Envelope Cuts, one cut	$110.00	@	$120.00
No. 1 Hard White Shavings, unruled	105.00	"	115.00
No. 1 Soft White Shavings	80.00	"	95.00
No. 1 White Ledger	55.00	"	65.00
No. 1 Heavy Books & Magazines	40.00	"	43.00
White Blank News	43.00	"	49.00
Mixed Kraft Env. & Bag Cuttings	75.00	"	85.00
No. 1 Assorted Old Kraft	45.00	"	55.00
Overissue News	28.00	"	—
No. 1 News	18.00	"	—
No. 1 Mixed Paper	12.00	"	—
Old Corrugated	30.00	"	—
Mill Wrappers	22.00	"	—

MARKETS

BLANC FIXE—Supplies adequate, demand steady, deliveries fair. Pulp is currently quoted at $55 per ton, in barrels, car lots, at works; and $60 less car lot same basis.

BLEACHING POWDER—Demand eased up, but supplies remain tight. Shipments improved. Quotations are unchanged. Prices on bleaching powder range from $3 to $3.75 per 100 pounds.

CASEIN — Current prices on processed acid precipitated casein are quoted around 24 to 26 cents per pound for domestic grades and 28 to 32 cents for imported grades f.o.b. shipping point.

CAUSTIC SODA — Some improvement noted in shipments, market still tight. Solid caustic soda is reported at $2.85 per 100 pounds; flaked and ground offered at $2.25 to $3.25 per 100 pounds, car lots, at works.

CHINA CLAY—Domestic grades in good supply, demand steady. Domestic filler clay is currently $9 to $11 per ton, car lots. Coating clay is currently $15 to $30 car lots. Imported clay is currently quoted at from $18 to $35 per ton, in car lots, export warehouse.

CHLORINE — Market tight as demand continues strong. Lack of tank cars continues to hamper deliveries. Quantities unchanged. Chlorine is currently quoted at $2.25 to $3.75 per 100 pounds.

ROSIN — Gum rosin in drums per 100 pounds, net, in yard New York, car lots, B, D, E, $8.25; F, G, H, I, $8.50; K, M, N, WG, & WW, $8.55. Wood rosin, per 100 pounds net, f.o.b., l.c.l. N. Y., B, $6.45; FF, $7.95; G, H, I, K, M, $8.28; N, $8.33; WG & WW, $8.45; X, $8.55.

SALT CAKE—Demand continues strong with slight improvement in shipments. Prices remain unchanged. Domestic salt cake is quoted at $20 to $26 per ton in bulk.

SODA ASH—Demand active with no improvement in the supply situation, previous orders filled. Contract orders prevail at the same high levels. Current prices, car lots, per 100 pounds, are as follows: in bulk, $1.10; in paper bags, $1.30; and in barrels, $1.70.

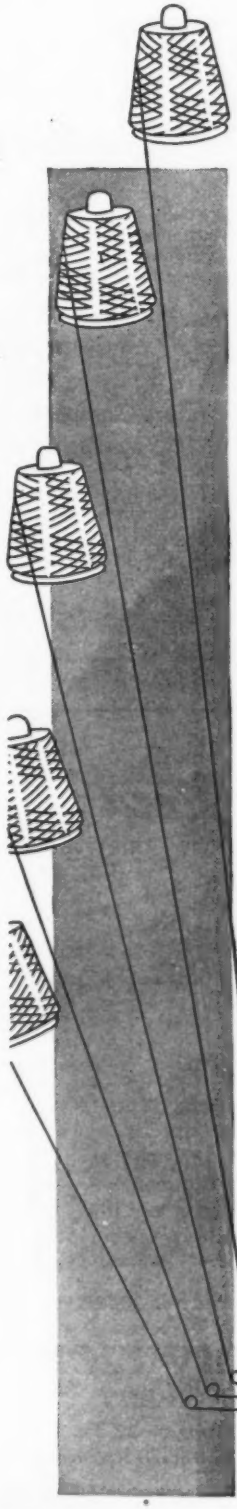
STARCH—Capacity production absorbed by active demand, export demand eased up. Starch prices continue strong with the pearl grade quoted at $6.37 per 100 pounds; powdered starch at $6.48 per 100 pounds, car lots, Chicago.

SULPHATE OF ALUMINA — Active demand covered by fair supplies. Quotations continue unchanged. The commercial grades are quoted at from $1.15 to $1.30 per 100 pounds, in bags, car lots, f.o.b. works. Iron free is quoted at $1.95 to $2.25 per 100 pounds in bags at works.

SULPHUR — Supplies ample to meet increasing demand. Annual contracts are quoted at $18 per long ton, f.o.b. mines; the price f.o.b. at Gulf Ports is $19.50 per long ton.

TALC—Domestic and French markets have eased up, prices remain steady. Domestic grades are currently quoted at from $16 to $30 per ton at mines; Canadian at $35 to $45 per ton. All prices in car lots.

YEARS OF EXPERIENCE IN THE MAKING OF FELTS PAY OFF IN LOWER COSTS TO YOU



There is no substitute for experience in making paper—none in the making of felts for paper making. Your objective and ours are the same: you want to get the most out of the felt you use—the longest life possible and the lowest cost of operation. We want to supply you with the felt that will do both, and do it consistently.

To achieve our part of this program, we bring to the making of felt for you the experience of 56 years; the craftsmanship that has been handed down from father to son; the genius for selecting the virgin wools that will combine to give the greatest strength, the *tenacity* from which the name of our felts is derived: **TENAX.**

Experienced as we are, we continue to improve upon our practice just as you do. Recent reports of the performance of **TENAX FELT** in the full-out production of this postwar period confirm the fact that our research and development is paying off for our customers in longer service and lower costs.

LOCKPORT FELT COMPANY
NEWFANE, N. Y.

TENAX
"TENAX FELTS ARE TOUGH"

SERVING THE PAPER INDUSTRY SINCE 1891

Sherman Products Produces New Package Medium

NEWTON UPPER FALLS, Mass. — A new type of packaging medium, which is designed to cut shipping costs drastically, has been announced by Sherman Paper Products Corporation. The new product, which will be marketed under the name of Corroflex Tube-Tainer, is described by the manufacturer as "Cushioned Containers in Continuous Rolls."

The Tube-Tainer is manufactured of Corroflex, a flexible-corrugated cushion packaging material which is widely used in packing. Its advantages of saving time, material, shipping weight and cube, are said to be carried still further in the Corroflex Tube-Tainer, a ready-made container in roll form.

Originally developed during the war as a sleeve used in packing palletized shipments of artillery shells, continued experiment and research led to the continuous roll feature of the new product.

Corroflex Tube-Tainer is supplied in stock rolls 250 feet long, in a variety of widths. To use it, the packer simply cuts or tears off the correct length from a roll mounted at his bench, inserts the product, and closes the ends. Any standard closure may be used with the Tube-Tainers.

Corroflex Tube-Tainer will be stocked and sold by approximately 200 paper distributors throughout the U.S.

Henry A. Sawin

Formerly with Wyman Gordon, has recently joined the engineering staff of the Sheppard Envelope Company, Worcester, Mass. During his 11 years' association with the Wyman Gordon company, he served as instrument engineer, employment manager, and on special assignments to the works manager and the treasurer. A native of Worcester, Mr. Sawin is a graduate of Bates College, class of 1936. He studied aeronautics at Worcester Tech and also attended Rensselaer Polytechnic.

Paper Trade Terms Revised, Enlarged

A revised and enlarged Library Edition of Paper Trade Terms by William Bond Wheelwright, containing ten new full page illustrations, has just been issued.

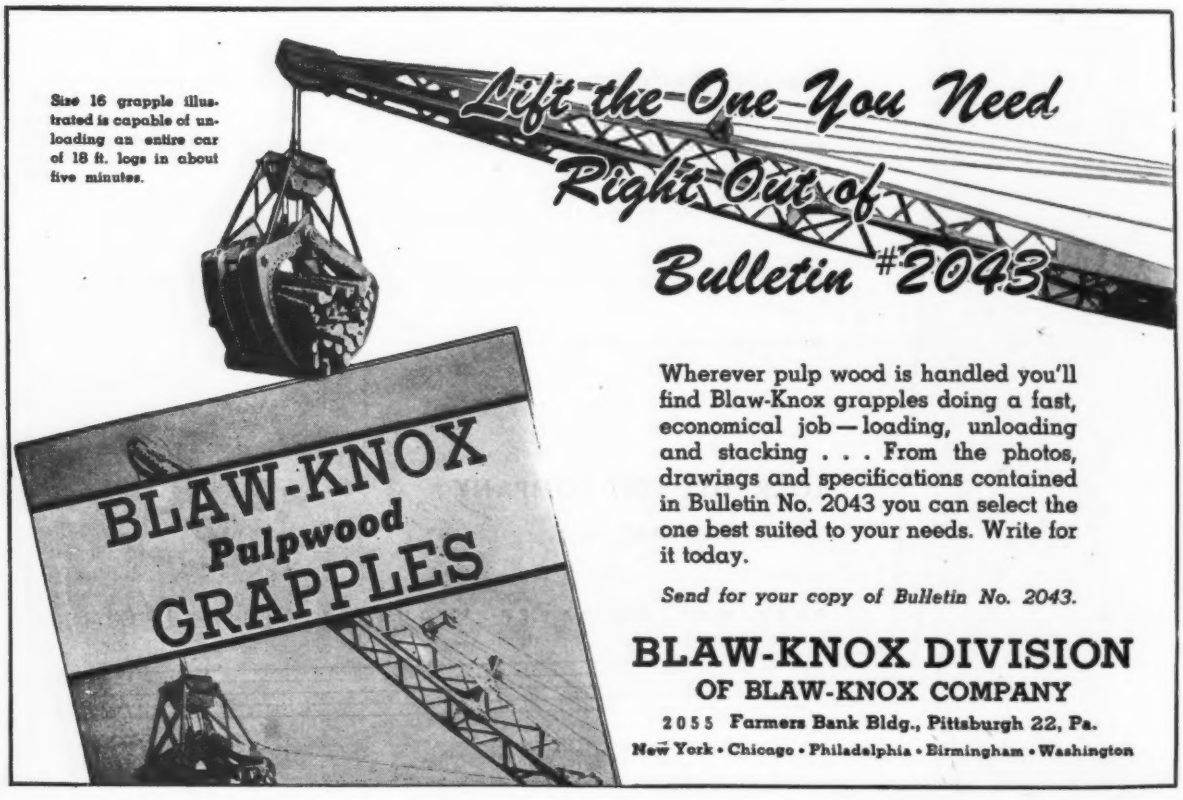
The definitions include those of the latest paper and paperboard specialties introduced during the war years, and covers quite completely the entire vocabulary of the paper trade. Also included are such mechanical and chemical terms as are helpful to clarify the paper terms. Acknowledgements are given to R. G. Macdonald, secretary-treasurer of the Technical Association of the Pulp and Paper Industry, for his assistance in the work of revision.

Five hundred copies only have been printed on rag content paper, bound in red cloth board covers, gold-stamped, 8vo.

Published by The Callaway Associates, 210 South St., Boston 11, Mass. Price $2 per copy.

Marathon Golfers Compete

MENASHA, Wis. — Marathon Corporation golfers competed for two trophies September 6 in the annual jamboree at the Calumet golf course near Chilton, Wis. The R. J. Sund low gross trophy was put into play for the first time. The other award is the Leo Croy low net trophy.


Size 16 grapple illustrated is capable of unloading an entire car of 18 ft. logs in about five minutes.
Lift the One You Need Right Out of Bulletin #2043
BLAW-KNOX
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GRAPPLES
Wherever pulp wood is handled you'll find Blaw-Knox grapples doing a fast, economical job — loading, unloading and stacking . . . From the photos, drawings and specifications contained in Bulletin No. 2043 you can select the one best suited to your needs. Write for it today.
Send for your copy of Bulletin No. 2043.
BLAW-KNOX DIVISION
OF BLAW-KNOX COMPANY
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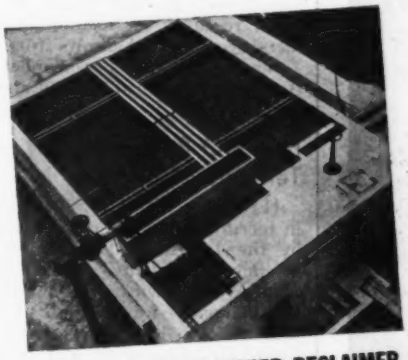
WITH Permutit–

YOU MAKE A PROFIT FROM THIS WASTE!

1. RECLAIM WHITE WATER PULP FIBRE! Permutit's White Water Reclaimer recovers a high percentage of valuable pulp fibre and filler otherwise lost. Recover your pulp fibre . . . and profit!

2. RE-USE PROCESS WATER! Where water is none too plentiful, The Permutit* White Water and waste water Reclaimer is of vital importance by permitting recycling of process water.



PERMUTIT WHITE WATER RECLAIMER for the recovery of fibre and filler from waste water, permitting re-use of the water.

ANOTHER way that Permutit Water Conditioning can help you is in improving the quality of your process water. It will remove iron, dirt, hardness, color, etc., to give you brighter, cleaner paper.

Permutit* will gladly analyze your water problems with you. Write for full particulars to The Permutit Company, Dept. PT-9, 330 West 42nd Street, New York 18, N. Y., or Permutit Company of Canada, Ltd., Montreal.

*Trademark Reg. U. S. Pat. Off.

Permutit

FOR 34 YEARS WATER CONDITIONING HEADQUARTERS

Market Forge Truck Line Adds Pneumatic Wheeled Truck

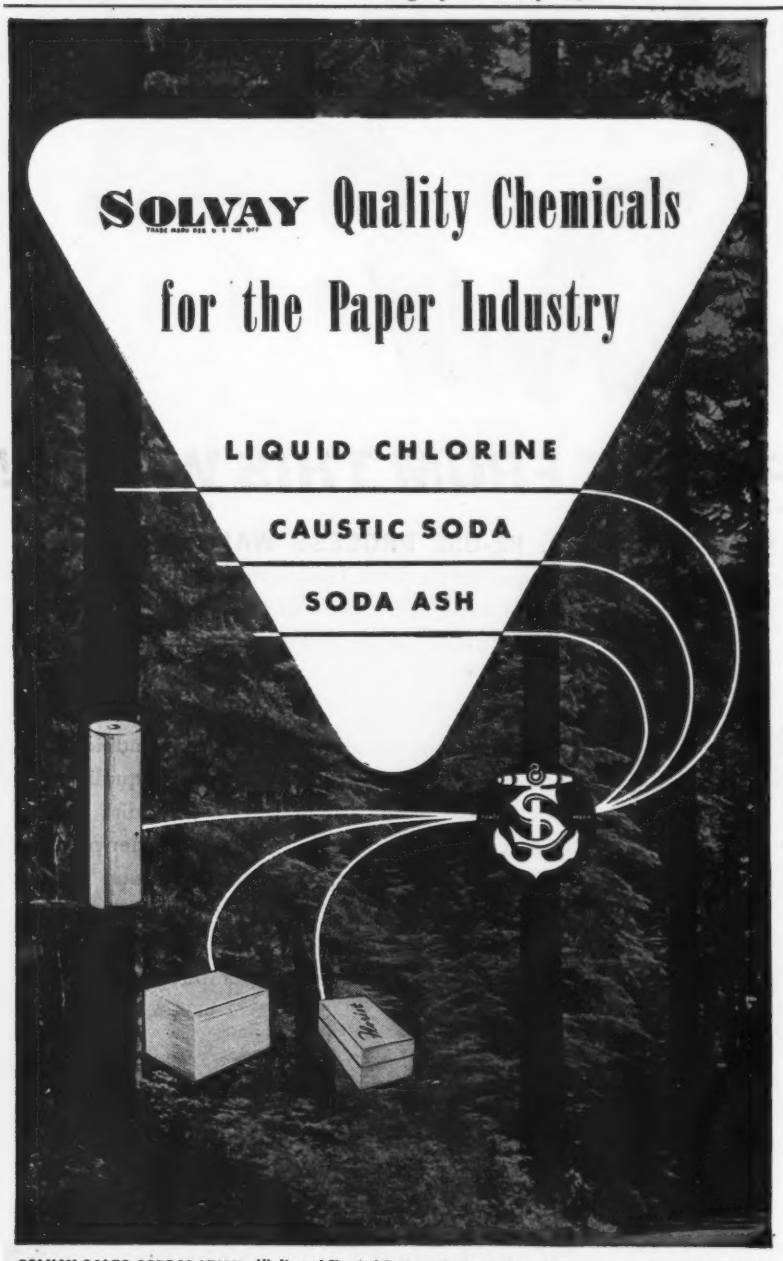
EVERETT, Mass.—The Market Forge Company has added a new standardized truck to their line of load-carriers.

This truck will be found desirable for those plants which require trucks to be handled both indoors and outdoors, and where quietness of operation, cushioning of load or unsatisfactory floors make this type unit desirable. Truck can be furnished with suitable devices for hauling by tractor, truck or auto. The truck has a rated capacity of 2500 pounds. The height of truck above the floor is 22 inches.

This truck is 30 inches wide and has 60 inches' length of loading space. It is furnished with four 16-inch diameter pneumatic wheels with tubes. The wheels are mounted on roller bearings. The truck is of the wagon type and the front axle is self-adjusting to include qualities of the floors. The pulling handle is equipped with a balancing arrangement which holds the handle off the floor at all times.

Kodak Names Dr. Staud

ROCHESTER, N. Y. — Dr. Cyril J. Staud has been named as new director of Kodak Research Laboratory. Dr. John A. Leermakers was named assistant director and head of the photographic theory department.



SOLVAY SALES CORPORATION Alkalies and Chemical Products Manufactured by The Solvay Process Company 40 Rector St., New York 6, N.Y.

Residents Protest Continental Mill Site

BUFFALO, N. Y. — Residents of the Old Colony Road - Colvin Avenue area of the town of Tonawanda may obtain a court order to restrain the Continental Can Company from erecting a paper container plant in Colvin Avenue near Brighton Road, Clarence R. Rudd, 118 Old Colony Road, indicated.

Rudd's announcement came after he and 50 other residents of the area appeared to protest to the town board what they said was its failure to advertise adequately the fact that the factory site was being rezoned from residential to business. Petitions containing more than 100 signatures protesting the location of the plant were presented.

Supervisor Roy R. Brockett said he had inspected the company's Utica plant and was "favorably impressed." He said that the rezoning had been properly publicized.

"The plant will be clean and desirable," Councilman Walter M. Kenney said. It will employ about 500 persons and will be an asset to the community. Otherwise, I would never have voted for it."

Samuel Spring Joins Pennsalt Research

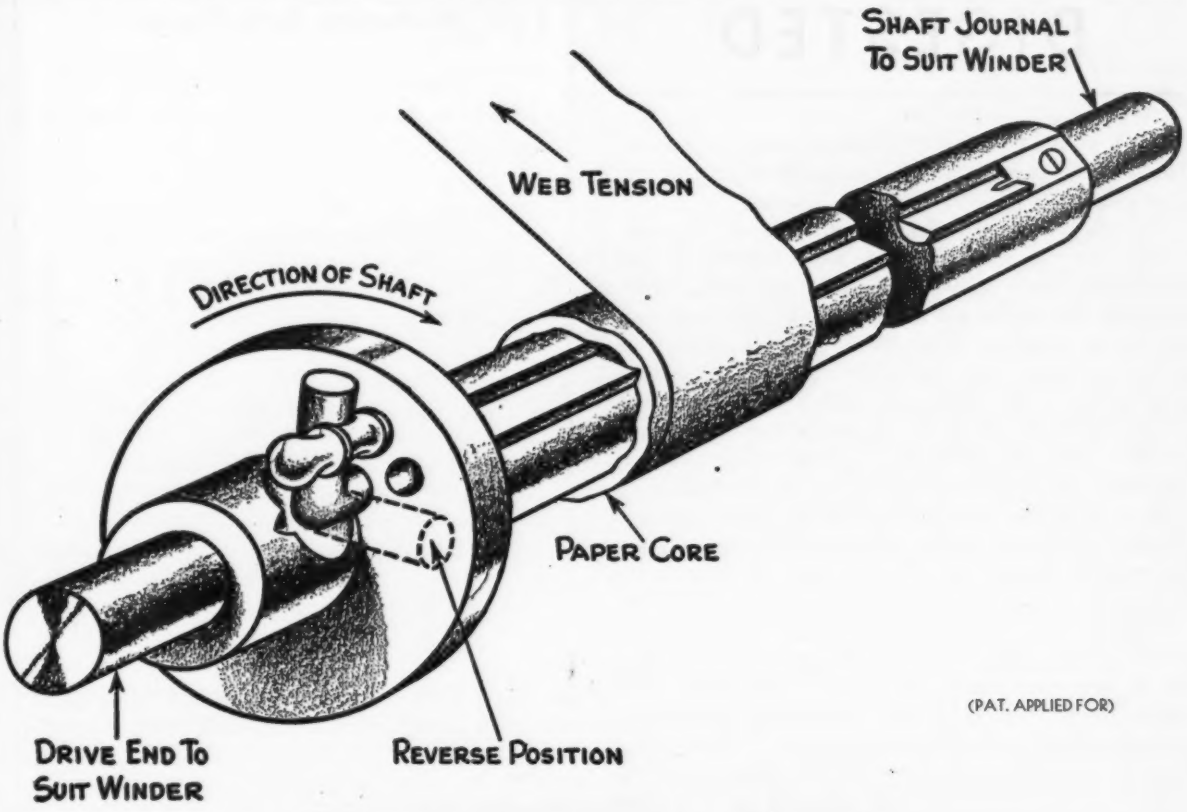
PHILADELPHIA—Samuel Spring, formerly a research specialist for the Federal Government, has been appointed to the Research and Development staff of the Pennsylvania Salt Manufacturing Company. He will have charge of the inorganic research group at Pennsalt's Whitemarsh Research Laboratories.

Mr. Spring, a native of New York City and a graduate of the College of the City of New York, received his master's degree at Columbia University. For two years he served on the faculty of City College of New York and later became associated with Frankford Arsenal where he supervised research on metal cleaners and metal-working lubricants for the last seven years. He is a member of the American Chemical Society and of Phi Beta Kappa.

NOPCO Revises Its Territorial Coverage

HARRISON, N. J.—Several changes in territorial coverage have been made by the Industrial Division of Nopco Chemical Company. In the Midwest, Frank J. Chadwick, who has been with the company for over 12 years, replaces Edson K. Rice who recently retired. Mr. Chadwick will service the accounts of both Nopso and Metasap Chemical Company throughout Wisconsin, Minnesota and North and South Dakota. The accounts formerly handled by Mr. Chadwick in Manhattan will now be covered by Thomas J. Campbell.

John J. McCloskey, Jr. has been assigned the Long Island, Brooklyn and Queens territory.



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The Collette Winder Shaft—TYPE S

- Extremely simple yet positive driving power
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- No loose collars, wedges or other auxiliary parts
- Not recommended for iron or metal-tipped cores

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DIGESTED

We have a new army of forgotten men and women. These are the persons who are so sorely affected by the high prices, yet must live on fixed incomes.

The tragedy of the situation affecting these people is that they see their life made more difficult day by day without any apparent objective to combat their situation. The effect on thrift and the virtue of saving for the eventual rainy day is apparent to all who think. It raises the serious question to the future generations of the wisdom of saving or insuring for old age under the hitherto accepted conservative plan. It will of necessity, if continued, tend to drive out of circulation the large volume of 'promises men live by' such as insurance for old age, bonds, notes, savings accounts, and other similar forms considered first-class and reliable investments. This situation will in time make even more serious the financial problem for our educational institutions, foundations, charitable endowments, hospital funds, etc. It will tend further to dry up the source of capital for business and agriculture, capital sorely needed to meet expanding production demands to satisfy world wants.—HENRY H. HEIMANN, *Executive Manager, National Association of Credit Men.*

Production Ratio Report*

(Production as per cent of six-day capacity)

COMPARATIVE WEEKLY SUMMARIES

Current Weeks—1947		Corresponding Weeks—1946	
July 26	106.1	July 27	104.7
August 2	103.9	August 3	105.2
August 9	105.1	August 10	103.4
August 16	104.8	August 17	104.5
August 23	103.7	August 24	106.1
August 30	*102.7*	August 31	105.6

COMPARATIVE MONTHLY SUMMARIES

1946				1947			
Jan.	94.7	June	104.6	Dec.	97.0	Mar.	106.1
Feb.	98.4	July	94.0	Year Avg.	101.1	Apr.	105.1
Mar.	104.4	Aug.	104.7			May	106.2
Apr.	102.7	Sept.	101.3			June	106.0
May	100.7	Oct.	106.4	Jan.	102.1	July	93.5
		Nov.	105.5	Feb.	105.9	Aug.	*104.0*

COMPARATIVE YEARLY SUMMARIES

	1940	1941	1942	1943	1944	1945	1946	1947
Year to Date	86.7	94.2	93.2	88.2	87.9	88.0	100.1	*103.6*
Year Average	85.6	97.4	90.4	87.8	88.1	89.4	101.1	

PAPERBOARD OPERATING RATIOS†

Current Weeks—1947		Corresponding Weeks—1946	
July 26	99	July 27	95
August 2	99	August 3	98
August 9	97	August 10	96
August 16	100	August 17	98
August 23	100	August 24	100
August 30	99	August 31	100

Year	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sep.	Oct.	Nov.	Dec.	Year Avg.
1946	90	91	100	99	94	97	89	99	96	100	99	92	96
1947	99	103	101	100	101	101	90	99					

* Based on tonnage reported to American Paper and Pulp Association. Does not include mills reporting to National Paperboard Association, except in isolated cases where both paper and paperboard are produced and separate tonnage figures are not readily available. Does not include mills producing newsprint exclusively.

† Per cents of operation based on "Inch-Hours" reported to the National Paperboard Association.

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EDITORIAL

Biological

Though he may safely leave the problem's solution to hands which already have got a first good grip on its basic facts, paper mill industrialist and technician appears to be on the verge of adding some phases of biology to his required knowledge of forestry and of chemistry. Bacteria, it appears, may offer a promising answer to the quest for something that will help rid streams of the vitiating effects of paper mill effluent, and those who have been close for the past couple of years to work in the Kalamazoo area are hopeful that their experiments may be expanded safely to full plant size. At least Philip F. Morgan, resident engineer for the National Council for Stream Improvement is sanguine that this will be the experience.

Morgan points out that so-called "domestic" waste from cities and institutions can be handled by conventional engineering procedures, reducing the problem to one of financing and construction.

At the same time, miscellaneous industrial wastes, he says, are not a major problem and might be discharged to municipal treatment plants without complications resulting. "White water" wastes from paper mills already have been reduced in quantity in most mills simply by the mills re-use of a larger portion of the water and by reduction of fiber content.

All of which has left the de-inking waste problem as the most difficult to combat from the standpoint of the designing engineer.

Early last year, the national council's laboratories set up at Kalamazoo College began development of a biological treatment process for the liquid fraction of the de-inking waste—that part of the waste which, held in suspension, had not previously been captured.

A harmless type of bacterial life which would feed upon the harmful organic material present in the waste was created. The scientists determined that the organic material present in the waste as a solution could be assimilated by the non-pathogenic bacterial life which had no harmful effect on river oxygen. Treated de-inking waste, although discharged into the river, would not create a pollution problem.

The laboratory experiments graduated from the test-tube and gallon jar class with construction of the "pilot plant" at Plainwell.

The plant, operated as a joint project by the Michigan Paper Company and the national council, has been in continuous operation since mid-July and has been treating about 10 per cent of the liquid fraction of the de-inking waste from the book paper mill.

Morgan, according to the Kalamazoo Gazette, holds out no hope that the Kalamazoo river will ever be "a sparkling clear trout stream" because, he says, "it is not that type of a river," flowing as it does through agricultural land. But with pollution conditions alleviated it no longer will be a "dead river," in his opinion. With pollution eliminated, the river will be able to support its normal biological life for the first time in many years.

Educational

In its relations with Labor and with capital the management of the Champion Paper and Fibre Company has taken as a second step the method that many other companies have used to start their chain of necessary contacts with both branches of industry. Many large corporations have incorporated into their plans the friendly explanatory message to workers as a development of periodical bulletins to stockholders. Champion has reversed this process. In a handsomely printed pair of financial statements distributed recently the financial facts of Champion's years are set forth in a well-illustrated effective text that also manages to tell a whole story about the company.

Says Frank Gerhart, advertising manager,

"The Annual Report to Champions is the third in a series aimed at defining more clearly the American free enterprise system and showing how the company fits into the national economic picture. We believe that we are safe in saying that its theme, The Story of American Business Management, has never before been treated in an employe report as it is here. Officers and managers of the company are introduced to the employes as being typical of the managers of American business. Management's responsibilities, position of employes in industry, and the role of capital in business are all discussed.

"The Report to Stockholders is a new venture in our program of stockholder relations. In addition to the financial section, we have added a well illustrated story of last year's operation. We intend thus to make stockholders better informed about the affairs of the company.

"Reason for issuing separate reports for employes and stockholders is based on differences in primary interests of the two groups. It is felt that, while employes are familiar with manufacturing processes and company products from their day-to-day associations with them, they know comparatively little about the management problems involved in production, sales and advertising, acquisition of raw materials and company financing. On the other hand, stockholders as a group are more likely to be management conscious, less informed about physical operations. Thus, each report has been designed to provide the information which the respective groups most need."

W. L. Cook

EDITOR

HYCAR AMERICAN RUBBER LATEX...
a new material for paper impregnation

HYCAR latex, when used as an impregnant for even inexpensive papers, imparts to the papers many desirable properties not readily obtainable with other impregnants.

Tear and wet strength are very considerably increased. Resistance to oils, chemicals, aging, and flexing are added in very desirable degrees. HYCAR-impregnated papers may then be coated with any one of a number of coating materials to impart additional properties.

Potential applications for papers of this sort range from gaskets to leather replacement materials, shelf paper to floor coverings, wallpaper to insoles.

HYCAR latex is very easy to use. No vulcanization is required. Normal drying times are used. And in latex form HYCAR is an inherently safe material to handle. No solvent system is needed even when HYCAR latex is used as a coating material.

We would be glad to work with you on any problems relating to the use of HYCAR latex. For more information, please write Department HJ-10, B. F. Goodrich Chemical Company, Rose Building, Cleveland 15, Ohio.

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122 E. 42nd ST., NEW YORK 17, N. Y. Edited By R. G. MACDONALD, Secretary

How to Determine the Desirable Rheological Properties of Coatings*

By Henry Green[1]

Abstract

In applying the science of rheology to a problem consideration must be given to what is to be measured, how it is to be measured, and what will the measurements mean in terms of ultimate product behavior.

The measurement of flow properties or "consistency" is discussed together with the various types of instruments which are used. It is stressed that the measurements so obtained must be applied to each specific problem on a trial and error basis to determine the relationship between instrument values and product characteristics.

Pigment-vehicle products like coatings, printing inks, and paints, have been subjects of rheological investigation for a number of years. Interest in them became particularly active when Bingham *(1)* in 1916 published his paper on plasticity, presenting to science his concept of plastic flow. This gave to the investigator a means for distinguishing definitely the difference between the flow of liquids and that of pigment suspensions.

Unfortunately the Bingham concept, as far as most industries are concerned, has remained one chiefly of scientific interest for it has been difficult to transfer it from theory to practice. The outstanding impediments have been unsolvable mathematics and unsuitably designed apparatus. Papers containing practical help to the investigator are scant and, consequently, the novice often lacks the necessary information even how to begin. The object of this paper is to help him gain that information and to offer him a rheological testing system that will enable him to develop and to interpret his work in a satisfactory manner.

When rheology, as a science, is to be used by an industry that has previously employed only technical tests, the investigator should first give consideration to answering the following questions: (1) What does he wish to measure? (2) How can he measure it? (3) What will such measurements mean in terms of ultimate product behavior?

In regard to the first question, his task is to measure the flow properties, or "consistencies," of his products. The answer to the second question concerns the kind of apparatus required for making such measurements. The answer to question three requires a system of trial and error, over an appreciable period, as explained presently. It should be noted that neither "accuracy" nor "precision" is involved. The nature of the rheology testing problem is basically one of concept and method. This must be emphasized for many investigators believe that passing from technical tests to scientific rheology is simply a transition from an inaccurate to a comparatively accurate method of measurement. Nothing could be farther from the truth.

It has been stated that the answer to question one is, "to measure consistency." This statement must now be qualified, for consistency has no measurable dimensions. Consistency is composed, however, of a number of things that do have dimensions, and the rheologist is forced to employ these for his measurements and to use them as a description of consistency whenever possible.

Consistency

Consistency is the nature of the flow a material acquires by virtue of its internal structure. This structure imparts to the material *all* its rheological properties. Two of these properties are well-known. They are, "viscosity" and "yield value." (See list of definitions at the end of this paper.) In certain types of consistencies, viscosity and yield value can be measured; in other types they can not.

The rheologist recognizes four basic types of consistency. These are expressed by four different types of "consistency curves" (See Fig. 1). These curves are obtained experimentally either by applying a known shearing stress to a material and measuring the ensuing rate of shear; or, by reversing the process, that is, by subjecting the material to a known shearing rate and measuring the resulting shearing stress. Either process is carried out for a number of shearing stresses or for a number of shearing rates, and the data plotted as shown in Fig. 1. The result is the consistency curve. When the curve takes the form shown at either (a) or (b), then viscosity, or plastic viscosity and yield value, can be calculated, provided the viscometer is constructed for such purpose. In the case of curve (a), consistency is given

* Presented at the Annual Meeting of the Technical Association of the Pulp & Paper Industry, Hotel Commodore, New York, N. Y., Feb. 24-27, 1947.

[1] Research Laboratories, Interchemical Corp., New York, N. Y.

by a single number — the coefficient of viscosity. In the case of curve (b) it requires two numbers to describe the consistency — plastic viscosity and yield value. Pseudoplastic and dilatant consistencies are best recorded in the form of curves produced under known conditions.

The Viscometer

The approach to rheology by means of the consistency curve not only tells the investigator the specific things that must be measured, but also gives him ample clues as to the requirements a suitable viscometer must have before it can make such measurements. By now it is evident that consistency can not be measured directly. However, consistency, expressed as a curve, has measurable ordinates, and because these ordinates define the position of the curve, they also define consistency. *The problem, then, is reduced to one of measuring the ordinates, shearing stress and rate of shear,* and from these measurements obtain, when possible, yield value, viscosity, and any other desired rheological property.

Before investigating commercial viscometers or before planning the building of a new instrument, there are certain construction details that must be discussed. The first of these concerns the flow pattern of the test material. There are two types — streamline and turbulent. In order that it can lend itself to mathematical treatment and can be duplicated at will, the pattern must be of the streamline type. This means having either very low rates of shear or very narrow passages through which the material flows. For reasons which will become apparent, recourse to very slow rates of shear is objectionable, therefore, the narrow passage method must be employed.

The second detail is in regard to temperature. Because rheological properties vary substantially with temperature, a suitable viscometer must always have some means for adjusting and controlling temperature. This requires the use of a constant temperature bath.

The third detail involves the method for measuring thixotropic breakdown. Many pigment-vehicle suspensions are subject to structural breakdown upon stirring. This structure reforms of its own accord when left undisturbed. Viscometers built for measuring materials that are suspensions of particles in liquid vehicles must, therefore, be capable of running two consistency curves for each material; one before and one after breakdown. Without this provision there is no easy way of recording the thixotropic nature of the material. This point is important to all investigators interested in measuring materials like coatings, printing inks, and paints. In addition to the major details mentioned in the previous paragraphs, there are many minor ones that can hardly be discussed here. Where they are of sufficient importance, they will be indicated.

There are various types of commercial viscometers that can be purchased from instrument makers. Each type will now be examined to see how nearly it fulfills the requirements necessary for obtaining consistency curves.

Cups

The cup viscometer, such as the Ford cup, is usually thin-walled with a hole in the bottom permitting the material to flow out. There are many objections to this type. First, a material like shaving lather would not flow out and its viscosity would be recorded as infinitely great. As a matter of fact, it is about a hundredth of 1 poise. The second objection is the inability of this type to produce streamline motion. To produce this pattern of flow, the length of the orifice must be at least 10 times its diameter. This can be corrected for by attaching a long tube to the orifice, but the first objection (and many others) still remain.

Falling Ball

This method is not entirely ruled out, but it is a method that is entirely too awkward for obtaining a sufficient number of points to give a good consistency curve.

Rising Bubble

This method is likewise too awkward for producing curves of a sufficient number of points. It is essentially a single point method. It is conceivable that bubbles of different sizes could be used, but in opaque materials bubbles are difficult to see, and if yield value is present the shape of the bubble could

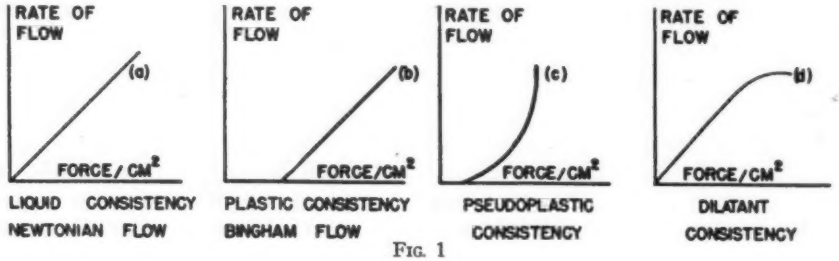

Fig. 1

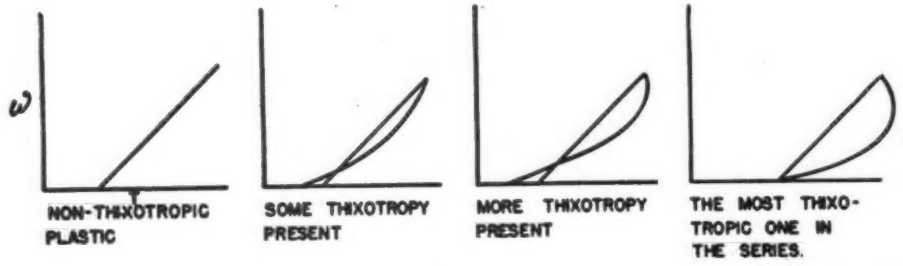

Fig. 5

be almost anything. In this latter case, no adequate mathematical treatment of the method could be made.

Capillary Tubes

Capillary tube viscometers such as the Ostwald are quite suitable for liquids; but for plastics of the pigment-vehicle type they give consistency curves that are *completely* nonlinear and, therefore, not satisfactory from a mathematical viewpoint. Originally, it was thought that yield value and plastic viscosity could be derived from them. It is now known that these values were only approximate ones. In addition to the preceding objections, capillary tube viscometers are not well suited for giving the "before and after" breakdown curves of thixotropic materials.

Oscillating Disks

These instruments have possibilities, but they have no advantages not possessed by rotational viscometers.

Rotational Viscometers

These viscometers are composed of two cylinders —the bob and the cup. There are two types: (a) the bob rotates and the cup remains stationary, e.g., the Stormer; and, (b) the cup rotates and the bob is stationary (after a steady state of flow is attained), e.g., the MacMichael. The materials under test is between the two cylinders in each case. Each instrument has a single drawback, but neither is serious. In type (a), the bob is rotated by a falling weight. This weight must be changed for each point on the consistency curve. This is troublesome and time consuming. In type (b), there is a difficulty in applying a constant temperature bath. This can be done, however, but requires a hole either in the side or bottom of the bath. This is to permit the entrance of the shaft that rotates the cup. Making this hole watertight is the difficulty.

If a watertight shaft can be inserted successfully, then there is no question that type (b) is preferable to type (a). This is the kind of viscometer that should be used by the investigator whose work includes products of the particle-vehicle suspension type. For a complete description of this kind of instrument reference should be made to the original literature *(2, 3, 7)*. Briefly, the viscometer is made of the following parts: (Fig. 2) suspension arm, a. torsion wire, b. shaft, c. ball bearings, d. d'. disk containing torque scale, e. bob, f. cup, g. waterbath, h. shaft, i. continuous gear shift, j. and motor, k.

The operation of the viscometer is comparatively simple requiring but a few minutes to produce a complete consistency curve. The material is placed in the cup g and allowed to come to temperature. The gear shift is then adjusted so that the revolutions per minute is at the lower end of the scale. The motor is started. The torque induced in the wire b is read on the scale, e, and recorded together with the revolutions per minute. The revolutions per minute is now increased and again recorded with its corresponding torque. This process is repeated until the operator feels that he has enough points to give him a satisfactory curve. This part of the curve is known as the "up-curve." The revolutions per minute is next reduced in small steps until the bottom of the revolutions per minute scale is attained. This procedure gives the "down-curve." The up- and down-curves will either coincide or will give a loop when plotted together. In the latter case, the material is thixotropic (See Fig. 3). The area of the loop indicates the extent of the thixotropic breakdown.

Reiner and Riwlin *(6)* have deduced the equation of plastic flow for rotational viscometers. From their work it can be shown that the plastic viscosity U, and the yield value f are:

$$U = \frac{(T - T_2)\ S}{w}$$

$$f = C\,T_2$$

where T_2 is the intercept of the down-curve on the force or torque axis and S and C are instrumental constants depending on the dimensions of the cup and bob. The torques T and T_2 are calculated from the wire constant and the scale reading on e, Fig. 2. w is the angular velocity.

$S = (1/4\ \pi_b - 1/R^2_c)/4\pi h$, R_b = bob radius
$C = S/(1 - R_c/R_b)$ R_c = cup radius

The coefficient of thixotropic breakdown M can be obtained from the area of the loop (curve b, Fig. 3), or better from two down-curves with two different top revolutions per minute. This work has been described by Green and Weltman *(4, 5)* and reference should be made to the original sources.

What the Viscometer Does

Specifically, the viscometer measures torque (shearing stress) and revolutions per minute. From these measurements the investigator can derive certain conclusions in regard to the flow behavior of the material. It should be noted that the viscometer can not tell whether the product it measures is good, bad or indifferent. It is only the investigator who can tell that, and then only after he has compared the viscometer measurements with the behavior of the material itself. For instance, a coating with yield value of 1000 dynes per cm² and a plastic viscosity of 100 poises can not be stated to be either good or bad until it is tried out. If it is found satisfactory then, and only then, can it be classified as rheologically satisfactory. It is, therefore, by trial and error that the investigator gets to know the correct values for U and f that make a satisfactory product for the job it is intended.

What has been said above is particularly applicable to industries that are using scientific rheology for the first time in their control work. In such cases it is impossible to state, offhand, just what the desirable

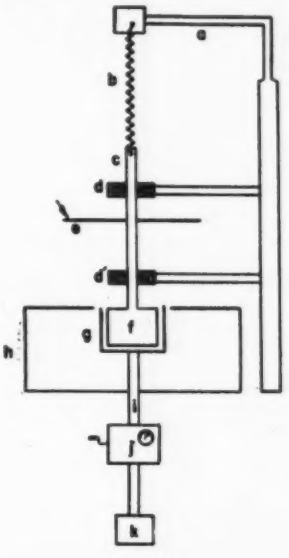

Fig. 2

rheological properties of their products are. The title of this paper is careful to avoid drawing such a conclusion and states that its only purpose is to explain how to determine these properties.

There are a great many things in rheology, however, that have passed the trial and error stage. Some of these will now be discussed in the paragraphs that follow.

Yield value is the result of a connected internal structure. This structure imparts plasticity to an otherwise viscous vehicle. It allows materials, like putty, to be molded and to retain their molded shape. It is the cause of such things as brush marks in paint, and could very well influence the surface smoothness of coatings. Deflocculating agents destroy either partly or completely connected structures, imparting greater mobility to the material. These facts are shown in the consistency curves (see Fig. 4). Microscopical examination bears out the above conclusions.

Of two materials having the same yield value but different plastic viscosities, the one with the higher plastic viscosity will feel tackier to the touch, other factors remaining the same.

Nonplastic materials having long molecules will give pseudoplastic consistency curves. This effect is the result of molecular alignment under the higher rates of shear used in the upper part of the consistency curve (see Fig. 1(c)).

The loops formed by plotting together the up- and down-curves of a thixotropic material are often referred to as "hysteresis" loops. If a series of thixotropic materials are lined up in the order of their visible breakdown, it will be found that they are also in the order of the areas of their hysteresis loop. The observer's natural tendency is to call the material with the largest area the most thixotropic one, and the material having the smallest area, the least thixotropic. The conclusion that follows is, that when the up- and down-curves coincide, giving no loop area, then the material is nonthixotropic (see Fig. 5).

The effect that thixotropic breakdown has on the working properties of the product must very often be taken into consideration when dealing with such materials. For instance, in printing inks, breakdown takes place as the ink passes through the printing press. This changes the consistency and, therefore, the tack of the ink and may easily destroy the final printing results. This is particularly so in the case of process inks where more than one color is used. Breakdown that lowers the consistency too much can produce such a low tack that adherence to the printing paper is insufficient and the color reproduction is not normal.

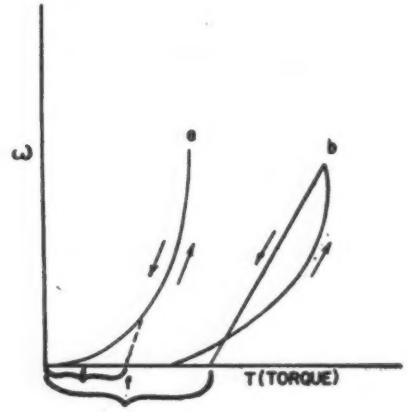

FIG. 3

TABLE I.—FEATURES OF VISCOMETERS

Type of Viscometer	Undesirable Features	Desirable Features
Cup	Orifice too short to produce streamline flow. No method of changing the shearing stress so that up- and down-consistency curves can be produced.	Quick and easy to manipulate. Easy to clean. Usually available on the market.
Falling Ball	Not easily adapted for producing consistency curves. Many balls of different weights would have to be employed to produce satisfactory curves. This would be awkward and time consuming.	Temperature control possible. Well suited for liquids where a single point method is satisfactory. In such cases these instruments can be made to give very accurate results.
Rising Bubble	Not easily adapted for making consistency curves. Bubbles of different size might be used for obtaining different rates of shear, but this would be of no value if the yield value altered the shape of the bubble or prevented it from rising.	Inexpensive and easy to operate. Suitable for approximate measurements of the viscosities of liquids of Newtonian type.
Capillary Tube	The flow of plastic materials of the pigment-vehicle type cannot give linear curves in these viscometers; consequently plastic viscosity and yield value cannot be calculated. These instruments are also unsuitable for obtaining hysteresis loops for thixotropic materials.	Excellent for Newtonian liquids. Easy to control the temperature.
Oscillating Disks	These instruments are not actually undesirable. They are constructed so that they do not differ substantially from rotating viscometers. If a choice must be made between the two it is better to select the rotational, as it is easier to apply to plastic materials.	Temperature control is easy. Can be used for producing consistency curves.
Rotating Viscometers	For temperature control, the rotating cup type requires the installation of a water tight shaft in the temperature control bath.	Easily adapted for the consistency curve method given in this paper.
	The rotating bob type requires the change in weight for every point on the consistency curve. This is troublesome and time consuming.	Easy to control the temperature.

Printing inks for letter press and offset printing require a certain amount of plasticity. This means they must have yield value for otherwise they would be unable to "stay put" and would flow out into places on the printing plates where they are not desired. Thixotropic breakdown might temporarily destroy the yield value and impair the value of the ink. Such possibilities must be considered and if found, corrections must be made. Analagous examples of the effects of thixotropic breakdown will no doubt be found in the coating industry.

Conclusion

The brief outline of experimental rheology just given was developed primarily for the investigator who is interested in those products classified as "suspensions." The discontinuous phase need not necessarily be composed of solid particles. The particles can be solid or liquid, microscopic, or submicroscopic, as in the case of true colloidal materials. The Bingham *(1)* concept of plastic flow is one of the cardinal principles upon which this system has been built. In measuring plastics, Bingham emphasized the fact, more than any other investigator, that

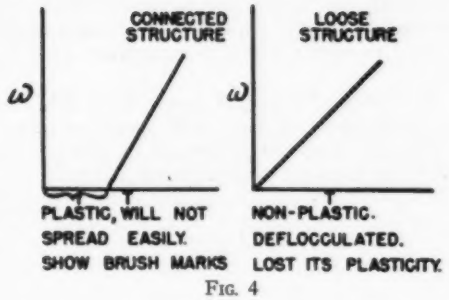

FIG. 4

though true liquids will sustain continuous flow under exceedingly minute shearing stresses, plastics do not flow until a definite shearing stress has been exceeded. This minimum shearing stress Bingham called the "friction." Later the term was changed to "yield value." A list of definitions follows.

Definitions

Dilatancy. A term used by Osborne Reynolds. It refers to those suspensions that stiffen under tension. The "voids" are approximately at a minimum. Any change in the position of the particles therefore increases the size of the voids. This makes the material appear dry.

Hysteresis Loop. In rheology this is the term that has been employed to designate the complete consistency curve of a thixotropic material. It is obtained by plotting the up- and down-curves together.

Plasticity. The property of being moulded without rupture and of retaining the new shape when the moulding force is removed.

Plastic Viscosity. The viscosity of a plastic material. It is obtained from the cotangent of the angle made by the down curve and the force axis. It is the number of dynes in excess of the yield value that will induce a unit rate of shear. Its unit is the poise.

Rate of Shear. The rate of shear between two parallel planes is their relative velocity with respect to each other divided by the distance between them. It is expressed by dv/dr. Its dimensions are velocity divided by distance. It is recorded as reciprocal seconds.

Pseudoplastic. A material that is neither a true liquid nor a true plastic. Its consistency curve starts from the origin and bends convex to the force axis. Resins, tars, and heavy oils represent this class.

Thixotropy. A property of suspensions that permits them to break down on stirring and to rebuild on resting. The action is non-chemical and isothermic.

Up- and Down-Curves. The two parts of the hysteresis loop of the consistency curve of a thixotropic material.

Viscosity. This term applies to true or Newtonian liquids. The coefficient of viscosity is the dynes of shearing stress necessary to induce a unit rate of shear. Its unit is the poise.

Yield Value. This is the minimum shearing stress that will cause flow in a plastic material. It is given as dynes per square centimeter. A dyne is approximately 1 milligram.

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Spot Conversion Drives in Paper Mills*

By Richard Nelson[1]

Abstract

This paper discusses the relative advantages and disadvantages of using as the source of direct current for adjustable speed drives in pulp and paper mills, the "common M-G system" versus the "spot conversion" or self-contained, packaged unit.

From his experience with variable speed drives for pulp and paper mill equipment acquired over a number of years, the author sets up four considerations as paramount in arriving at the right choice of system for any given installation: (1) Cost of installation, (2) flexibility of reuse, (3) cost of maintenance, and (4) operating performance.

Citing specific instances in the pulp and paper field where one system or the other was chosen—and the reasons why—the author fortifies his conclusions with detailed cost figures.

Attention is also given to recent electronic developments, with examples of where electronic variable speed drive characteristics have proved especially useful in the paper field.

In pulp and paper mills, there is an ever increasing demand for an individual, compact, flexible and smoothly-operating variable speed drive for rotating machinery. This demand is generally caused by the requirements for closer quality control and lower unit costs in paper products ranging from the conveyors in the wood room to the driving of machines converting the end product.

The proper choice of this type of drive is one of the many problems facing the paper mill engineer. There are many types from which to choose, both mechanical and electrical, depending upon the application, with the choice usually dictated by the load characteristics. In the latter category, the most popular in the paper industry appears to be the variable speed direct current motor. The term "most popular" is used because it provides a smooth, stepless speed range, is convenient and simple for an operator to control, and has been proved in thousands of past installations.

In choosing the source of direct current with which to feed these motors, the first decision that confronts the design engineer is whether to install a large motor generator set with which presently or ultimately to feed a common source of direct current to several motors simultaneously or to use a spot conversion unit for each drive motor and thus isolate each drive. The former system is usually referred to as a "common M-G system" and the latter as a "packaged drive."

Although basically the two schemes are the same,

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namely, the speed of the direct current motors vary in accordance with the varying magnitudes of voltage impressed upon their several windings, there is a slight difference in their operating characteristics. In the common M-G system, the voltage output of the common direct current generator is held nominally constant; the speed of the direct current motor being changed by changing the amount of resistance in the motor's field circuit. The more resistance that is inserted in the field circuit, the weaker the field flux density becomes and the faster the armature revolves. Obviously, then, the slowest speed at which the motor will run is when the field is the strongest and conversely the fastest speed is when the field is the weakest for a given armature condition.

The horsepower output of a direct current motor operating under these conditions is nominally constant over its entire speed range, but the torque varies directly with the field strength. Another way of saying this is that the faster the motor runs, the less is its torque. It can be shown, then, that the faster the motor runs and the further it gets away from its basic speed, the poorer is its speed regulation. Speed regulation is defined as the difference between no load speed minus full load speed divided by full load speed expressed as a percentage.

Generally speaking, processing machinery such as is used in paper mills requires a driving torque that is approximately constant, regardless of speed. Therefore, since field-weakening, direct current motors produce their minimum torque at their highest speed, the size of the motor is determined by the high speed condition and the motor is capable of producing torque in excess of requirements at lower operating speeds.

These inherent difficulties are largely overcome in the packaged or spot conversion type of drive. Here, each direct current generator can be operated in such a manner as to give each individual motor its best operating characteristics. Constant torque output may be realized by varying the motor armature voltage over a goodly portion of its speed range with the field delivering maximum flux density. The torque starts dropping off only on the upper portion of the speed range corresponding to those speeds above the basic speeds of the motor. The characteristics of each drive are then independent of one another and are not tied down by one part of a system.

Obviously, if the installation is going into an existing mill which has unused direct current available from a common motor generator set, and the characteristics of this type drive as mentioned above are satisfied, it would be economically unwise not to use this capacity. However, in planning a new mill or an extensive expansion program as so many are presently doing, the spot conversion or packaged direct current drive system of speed control often offers many advantages that can be expressed not only in words, but also in dollars and cents.

M-G System and Packaged Drive Systems

Experience in variable speed drives for pulp and paper mill equipment acquired over a number of years has taught the writer that four considerations are paramount, namely.

1. Cost of installation. This point hardly needs to be elaborated upon since in any analysis of one general design over another, the final decision is usually made in favor of whichever one is cheaper. All other factors being equal, this is especially true of the machine drive since the most critical effect on the product being processed is due to the characteristics of the machine itself. An example of cost differences as applied to a new installation appears later in this paper.

2. Flexibility of reuse. It seems to be fairly inherent in the makeup of paper mill operators to be continuously searching for newer and simpler methods to arrive at the best end result. Paper and pulp mills of the author's acquaintance frequently replace or interchange process equipment in their search for these better methods. For variable speed drive machines using direct current motors fed from a common motor-generator set this changing about can become very costly.

If a straight block of direct current power is required for an addition of equipment, it is as likely as not that this will use up what extra or spare direct current capacity there is left in the system or even require the additional purchase of direct current conversion machinery larger than would be immediately required. While the extra capacity may be justified on the ground that it is simply today's anticipation of tomorrow's demands, it is just as likely that when tomorrow arrives, a different method altogether will be wanted. Since direct current power distribution in paper mills is generally less inclusive than alternating current distribution, power feed costs are increased to overcome line losses for a given or larger area inclusion. The point to be made, therefore, is that the packaged drive is much more flexible when machinery changes are to be contemplated. As obvious as this seems, it has often been overlooked in the past when planning installations of new equipment.

3. Cost of maintenance. There has been considerable discussion within the trade regarding maintenance on spot conversion units. It is true that there are more commutators to maintain and that commutating systems are the cause of more troubles than any other on a direct current drive. However, in one mill where both of the systems under discussion are present, it was found that the dollars spent for spot conversion maintenance were less, due in part, at least, to the fact that the large direct current generator associated with the common M-G system could only be worked on during a major mill shutdown. Since this rarely occurred, except over weekends, the work had to be done then—at premium labor rates.

The direct current generators associated with the packaged drives are smaller in size than their counterparts in the common M-G system and hence are easier to handle, both in installation and maintenance. For the number of packaged drives involved, a justifiable spare unit was available which could be installed in place of the offending set while it was worked on at the leisure of the maintenance department—and on straight time. Also, since lower current values are handled in the packaged system, the control elements, such as contactors, are necessarily smaller and so are subject to less maintenance.

4. Operating performance. This is rather inclusive, but does bear mentioning. The operating characteristics of the drives under discussion have already been given, but in choosing any kind of drive it is of the utmost importance that the load characteristics be considered. The variable speed drive classification embodies several types other than those under consideration here and they should not be overlooked in making a choice. However, it will be found that in the majority of cases, the packaged system herein discussed will satisfy the performance specifications required.

Application of Packaged Drives

Having discussed briefly their general points of advantage, some specific cases in pulp and paper mills where packaged direct current drives were chosen to do particular jobs and of one case where they were not should be discussed. In the first case, a modern kraft mill was being designed where, among other components, there was to be a bleachery and a pulp washing department in rather close proximity to one another with the equipment in question located in a concentrated area. The process engineers who designed the equipment requested four individual 10 hp. 600 to 2300 r.p.m. variable speed drives for the brown stock washers and six individual 15 hp., 600 to 2300 r.p.m. variable speed drives for the bleach washers. It was specified that the drives should have good speed regulation, a constant torque, tapered horsepower load characteristic was recommended, and a stopless speed controller was to be provided for mounting on the operator's panel. These pieces of equipment are part of a continuous flow process in a mill that is geographically isolated, so that it was also specified that spare generator capacity as well as spare motor capacity should be included in the initial design.

Offhand, one would assume that either of the two schemes under discussion would meet these requirements; that the only point of argument as regards performance would be the one of speed regulation. To operate the common M-G system over the specified speed range would require the individual motors to operate with a progressively weaker field as the speed increased. This, then, would contribute to a progressively poorer speed regulation. It was found from the catalogs that the direct current motors associated with the packaged drive operated with a basic speed of 1150 r.p.m. which means that armature control is used up to this speed and field weakening only in obtaining speeds beyond this. In other words, the weak field speed range is less on the latter system. This, then, was one distinct advantage in favor of the packaged drive as far as the basic requirements were concerned, since all of the other specifications could be met with either system.

Spare generator capacity for the common M-G system would be handled as follows: Since the pulp washing motors required an aggregate of power necessitating a 30 kw.M-G set and the bleachery a 75 kw. set, if each department were furnished with a 100 kw. M-G set, both departments could operate adequately off of either one if the odd set were down for repairs. Spare motors in each size would also be required. For the packaged drives, one complete 15 hp. variable speed unit, consisting of M-G set and d.c. motor, plus a 10 hp. d.c. motor, would take care of any trouble.

Armed with this design, the labor and material costs of the items required in a common M-G system were estimated.

TABLE I—INSTALLATION COST—COMMON M-G SYSTEM
(Overhead and Supervision included in Figures)

	Material	Labor
2—100 kw., Motor-Generator sets	$8,600	$500
2—generator motor starters	580	100
2—generator disconnect switches	540	50
2 d.c., control panels	2,000	300
4—10 h.p., 230 volt pipe-ventilated motors	3,200	100
6—15 h.p., 230 volt pipe-ventilated motors	5,820	175
10 motor field rheostats	500	50
10 push buttons	40	40
2 motor generator set foundations	200	400
Control engineering	....	200
D.c. motor wiring	980	3,000
Generator wiring	200	300
Generator motor wiring	200	300
Cooling system	800	1,000
Spare 15 hp. d.c. motor	970	....
Spare 10 hp. d.c. motor	800	....
Grand total $31,945	$25,430	$6,515

Due to the corrosive chlorine atmosphere, it was decided to pipe-ventilate the direct current motors and to place the M-G sets and control in a ventilated room nearby. The room is not included in the costs since it was already available for an alternating current substation. Using current U. S. material price quotations and unit cost data from a large private electrical installer, the total cost for the installation worked out to $31,945 as detailed in Table I.

With the same end result in view, a similar estimate was prepared, using the spot conversion system of variable speed drive. This was based upon utilizing rotating machinery for converting from alternating current to direct current and the detailed estimate was made up of the following components:

TABLE II—INSTALLATION COST—V*S SYSTEM
(Overhead and Supervision included in Figures)

	Material	Labor
4—10 hp. packaged drives	$5,000	$200
6—15 hp. packaged drives (each consisting of a.c. control, M-G set, exciter, d.c. control, and pipe-ventilated d.c. motor	9,000	300
D.c. motor wiring	980	3,000
Packaged drive foundations	200	300
Cooling system	800	1,000
Spare 10 hp. d.c. motor	450	....
Spare 15 hp. packaged drive, complete with spare 15 hp. d.c. motor (Conversion and control equipment for the unit is suitable to feed any of the d.c. motors in the system)	1,500	....
10—200 amp. safety switches	650	150
Packaged drive a.c. motor wiring	795	1,265
Grand total $25,590	$19,375	$6,215

As can be seen from Table II, the packaged or spot conversion system estimate adds up to $25,590. For this case, there is, therefore, a saving of $6,355 or 20% in favor of the spot conversion scheme.

Analyzing the two estimates shows that while the direct current motor wiring, foundations and cooling systems are about the same in both cases, the largest tangible differences are to be found in the conversion from alternating to direct current, in the motors and controls, and in the spare capacity. The packaged drives are higher in the alternating current wiring because there are more units to be connected. For this particular installation, then, the spot conversion units were selected on a basis both of the intangible advantages and the actual saving of 20% in cost.

It should be pointed out that the fullest advantages of the spot conversion units were not realized in this case since due to the atmosphere the individual M-G sets and their attendant controls were not located at the machines in question. Had they been so located, it is probable that there might be additional slight savings in wiring costs, but since they were still relatively close, this is problematical and no advantage for this factor is claimed. However, were the electrical substation room mentioned above 200 or more feet distant from the direct current motors in question, it would undoubtedly have proved less expensive to install the M-G sets immediately adjacent to the drives as the term "spot conversion" suggests.

A second case where a decision had to be made between the common M-G system and the spot conversion system arose in the design of this same mill. After having made the above comparison, however, the choice of the packaged drive was so evident that it hardly provoked any discussion.

At the far end of the mill adjacent to the wood room it was desired to have a variable speed drive on a screw conveyor discharging chips from a chip bin. Normally, this might have been the place for a wound rotor alternating current motor. However, it was specified that the speed range should be in a 4 to 1

ratio and, since ordinary wound rotor motors are not recommended where the speed ratio exceeds 2 to 1, the direct current motor was chosen for driving the conveyor.

Had a central direct current system been chosen for this mill, it still would have been problematical whether or not power from it would have been used to drive this motor which was located over 600 feet from the logical location for a common M-G set. The increased copper sizes necessary to overcome the line losses on a run such as this could be charged only to that one installation and hence the packaged drive again became the economic choice. A comprehensive alternating current distribution system throughout the mill made it very easy to mount the conversion unit and the direct current control near the drive and thus have a truly packaged, spot conversion installation.

A case where another type of variable speed drive was chosen is worthwhile mentioning to show that the four factors outlined earlier in this paper should be considered in every instance. The problem was presented in much the same fashion as those previously discussed, but this time two vacuum thickeners were involved. However, upon quizzing the operators more closely it was discovered that the constantly variable speed which had been specified was not necessary since entirely adequate operation could be expected with the thickener operating at one of four constant speeds. It was suggested and later approved that four-speed a.c. motors be used on these machines. since the four standard speeds of such a motor (namely 1800, 1200, 900, and 600 r.p.m.), would satisfactorily cover the desired range. Maintenance also came in for some consideration in this case when it was pointed out that too frequent operation of the necessary four-speed motor contactor would increase contactor maintenance to the point where it might become excessive, costwise. When, however, assurance was given that the cycle of speed change would be a matter of days rather than minutes, this objection was eliminated. With, therefore, all operating characteristics satisfactorily met, the cost of the installation became the determining factor in its choice.

So far, this paper has dealt with rotating machinery as the means of converting from alternating to direct current. However, the fact must not be overlooked that the motor generator set has a kid brother just trying on his first pair of long pants. This is the electronic rectifier. Several manufacturers have these units on their assembly lines under various trade names, but it is interesting to note that they all follow the spot conversion scheme of presenting energy to a direct current motor. A discussion of this type of packaged drive is too large an undertaking to do it justice here, but one or two characteristics as applied to pulp and paper mills with which the writer has had experience may be worth mentioning briefly. The greatest advantage of the electronic type unit over any other system is its ability to take its control from literally anything. Motor speed may be caused to be changed either manually by turning a rheostat knob or automatically by variations in mechanical or electrical parameters.

One recent application of the electronic spot conversion variable speed drive was to the feed mechanism of a Roberts grinder. This should prove especially interesting to those paper mill operators who generate their own power. Since the groundwood electrical load is a major part of the mill load, grinder load swings usually require considerable attention on the part of turbine room operators. In this new application of an old principle, the change in grinder motor load current causes an opposite change in feed motor speed, thus tending to hold the load constant within the limits designed into the electronic control circuits. The electronic control, plus the features of spot conversion done up in a package, promise to hold the answer to many paper mill control problems. It is the opinion of the writer, however, that at the present time, mill electricians generally lack the technical know-how required for 100% satisfactory maintenance. That proper job training is required is realized and should go far towards popularizing industrial electronics.

Whether it is the choice of the paper mill engineer to use electronic or rotating machinery methods with which to convert his direct current, it is felt that by tackling variable speed drive problems by using the four points mentioned earlier—(1) initial cost, (2) flexibility, (3) maintenance cost, and (4) performance,—the answer will more and more often come out in favor of the spot conversion, packaged drive system of speed control.

Kalamazoo TAPPI Program

The Kalamazoo Valley Section of the Technical Association of the Pulp and Paper Industry has announced its schedule of meetings for the 1947-1948 season. These are as follows:

October 2, 1947: Organization and Function of a Technical Department. Program in charge of W. A. Kirkpatrick, Allied Paper Mills.

November 6, 1947: Quality Control. Richard Trelfa, Hercules Powder Company, in charge.

December 4, 1947: Coating. Victor Burstein, Michigan Paper Company, in charge.

January, 1948: Joint meeting with Superintendents Association.

February 5, 1948: Water, White Water, and Ion-Exchange Resins. John B. Verdon, American Cyanamid Company, in charge.

March 4, 1948: Materials Handling. Preston Carter, Kalamazoo Vegetable Parchment Company, in charge.

April 1, 1948: Graphic Arts and Printing. W. K. Kidder, Bryant Div., St. Regis Paper Company, in charge.

May 6, 1948: Engineering Program. L. J. Scheid, Watervliet Paper Company, in charge.

New TAPPI Members

The Executive Committee of the Technical Association of the Pulp and Paper Industry has elected the following to membership:

Sidney A. Grossman, Treasurer, Liberty Corrugated Container Corp., Brooklyn, New York, a 1938 graduate of St. John's University.

Lewis A. McKeown, Engineer, National Aluminate Corp., Chicago, Illinois, a 1940 graduate of the University of Montreal.

Walter J. McNamara, Albany, New York, Sales Representative, The Wm. Powell Co., Cincinnati, Ohio. He attended Carnegie Institute.

Enrique A. Scotto, Engineer, Celulosa Argentina, S. A., Buenos Aires, Argentina, a 1943 graduate of Buenos Aires University.

Mortimer E. Stern, Vice-President and Technical Director, Federal Adhesives Corp., Brooklyn, New York, a 1918 graduate of Case School of Applied Science with a M. Sc. in Chemistry.

The Cold Alkaline Purification of Wood Cellulose*

II. The Influence of Surface Properties on Resistant Pentosans

By Alexander Meller[1]

Abstract

Experiments designed for studying the influence of surface properties of wood pulps, conditioned by drying, beating, and sorting, on the removal of hemicellulose by 7% cold alkali solution revealed that:

1. The total hemicellulosic materials removed decreased in instances when the heat drying was not accompanied by a drastic depolymerization as measured by the viscosity in cuprammonium solution. When heat drying caused a great decrease in viscosity, the total hemicelluloses removed increased slightly. As a result of drying at higher temperature, the resistant pentosan content and the removal of nonpentosan materials (essentially cellulose and its degradation products) increased in almost all instances.

2. Beating reduced the resistant pentosan content, but this reducing effect of beating may be reversed by drying at higher temperatures.

3. The viscosity in cuprammonium and the resistant pentosan content of the coarse fraction (+ 60 mesh) of a bleached hardwood (eucalypt) sulphate pulp were higher than those of the parent fibers.

In the first paper *(1)* on the cold alkaline purification of wood cellulose, the influence of beating by hypochlorite and of acid hydrolysis on resistant pentosans, i. e. pentosans insoluble in cold 7% sodium hydroxide solution, was discussed. Reference was there made to the results of investigations, *(2, 3)* according to which the extent of removal of hemicellulosic materials by cold alkali solutions is greatly influenced by the pretreatment of the fibers. Information available, however, of the manner in which resistant pentosans in pulps are affected by pretreatments, which markedly influence the surface properties of fibers, is very scanty. Therefore, the second part of the program consisted of investigating possible relations between surface characteristics and resistant pentosans in cellulosic fibers. In particular, an attempt was made to find how (1) drying, (2) beating, and (3) sorting of wood pulps affect the removal of hemicelluloses by 7% cold sodium hydroxide solution.

Experimental

The experimental program may be described broadly as follows:

1. Unbleached, chlorinated and hypochlorite bleached softwood sulphite and sulphate pulps, and hardwood sulphate, were dried under different conditions and investigated for their solubility in 7% cold sodium hydroxide solution, viscosity in cuprammonium, and total and resistant pentosans.

2. Different pulp samples in unbleached, chlorinated and bleached forms were beaten in a Lampen mill and the beaten pulps, after drying at two different temperatures, were tested for the characteristics listed above.

3. Finally, a fully bleached hardwood sulphate pulp was sorted (mechanical fractionation); the parent material and the + 60-mesh fraction were investigated in the same manner as above.

The details of the experimental program are set out in Table I below and in the paragraph following this table.

The sulphite pulp used was a product of the Canadian International Paper Co., Gatineau; the sulphate pulps (pine and eucalpyt) were from the Australian Paper Manufacturers Ltd., Maryvale Mill, Victoria, Australia.

The "chlorination" of the pulps consisted of a treatment with chlorine water at 3.5% stock concentration for 30 minutes at 20 to 22° C.. The percentage chlorine is referred to the moisture-free weight of pulp present. The chlorinated stock was either washed free of the acid effluent and then dried, or it was first neutralized with alkali and then washed, and dried. The period of drying was 24 hours. The hypochlorite bleaching involved a treatment of a pulp sample with calcium hypochlorite solution at 10% stock density (moisture-free) at 32 to 35° C., until practically all the available chlorine had been used up. The bleached pulps were then washed, lapped and dried. In some experiments, the dewatering of the wet fibers was accomplished by a displacement method, i. e., displacing the water in the pulp by treating it successively with alcohol, ether and benzene, and finally keeping the pulps in a vacuum dessicator containing paraffin for absorbing benzene vapors. Samples dried by this method are designated as AEB, while samples dried at 30 to 35° C as —L (low), and those dried at 105° C. are marked with —H (high).

The beating of the pulps was performed in a Lampen mill, and unless specially recorded, the freeness of the beaten pulps was about 280 to 300 ml. (Canadian freeness).

For the sorting of the fibers, a 60-mesh vibrating wire screen was used in an instrument known as the Somerville-Fractionator, designed by Mr. J. L. Somerville. The fraction retained on the 60-mesh screen was collected, lapped, and dried.

All the dried pulp samples were disintegrated in a hammer mill for the analytical investigation. The methods of analyses and interpretations were described in the first paper.

Discussion

Before going into a detailed discussion of the results, it should be pointed out that in order to establish certain relationships between the surface characteristics of fibers, conditioned by drying, beating, and sorting, and their behavior towards cold strong alkali solutions, it is necessary to draw attention to certain limitations. Some of the factors investigated are

* Presented by title at the Annual Meeting of the Technical Association of the Pulp & Paper Industry, Hotel Commodore, New York, N. Y., Feb. 24-27, 1947.

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likely to affect both the surface characteristics and the chemical composition of cellulosic fibers. This brings about an overlapping of the influencing factors, some of which oppose each other in their concurrent action, while some others are mutually supplementary. It is obvious that, for instance, drying of wet fibers at high temperatures brings about changes in the surface characteristics, and these changes in the surface may be accompanied by a depolymerization and oxidation of some constituents. Both these changes in the surface and in the chemical composition influence the behavior of the fibers towards cold alkali solutions. Thus the individual effects of the influencing factors in many cases cannot be measured easily, and this circumstance makes it difficult to draw unequivocal conclusions.

(a) The Influence of Drying

It appears that on heat drying the total pentosan content, as determined by the method applied, did not change appreciably, although a slight decrease in some instances was noticeable. Since heat drying decreases the active surface and the reactivity of cellulosic fibers, the reduced reactivity may cause the volume of volatile aldehydes, liberated in the distillation with 12% hydrochloric acid during the customary distillation period, to decrease. The reduced ability of heat dried fibers to enter into various heterogeneous reactions has been observed and discussed by several authors *(4)*.

Under test conditions, the total hemicellulosic materials removed by 7% cold sodium hydroxide solution decreased in instances when the heat drying did not cause a drastic depolymerization, as measured by the viscosity in cuprammonium solution. In some cases, the drying at the higher temperature caused a great decrease in the solution viscosity, and the removal of hemicelluloses by the cold alkali solution increased slightly. It seems, therefore, that the net result depends upon which of the opposing factors dominates, i. e., the decreased surface, causing a lower accessibility of the fibers to the purifying solution or the depolymerization (or oxidation) bringing about a greater solubility.

The resistant pentosans increased in almost all cases as a result of heat drying. It should be emphasized again that the term resistant pentosans is only defined by the method of determination. The experiments and tests do not permit conclusions to be drawn as to whether this increase in resistant pentosans is the result of the formation of cross linkages,

TABLE I.—SHOWING THE PRETREATMENT OF THE PULPS USED

Pulp	Series No.	Dried at °C.	Bleaching Conditions	Beating in Lampen Mill
Softwood sulphite	45S-237-L	30-35	Unbleached	Unbeaten
	45S-237-H	105	Unbleached	Unbeaten
	45S-237-b-L	30-35	Unbleached	Beaten
	45S-237-b-H	105	Unbleached	Beaten
	46B-5-L	30-35	Chlorinated with 2% Cl; not neutralized	Unbeaten
	46B-5-H	105	Chlorinated with 2% Cl; not neutralized	Unbeaten
	46B-6-L	30-35	Chlorinated with 2% Cl; neutralized	Unbeaten
	46B-6-H	105	Chlorinated with 2% Cl; neutralized	Unbeaten
	46B-9-L	30-35	Hypochlorite bleached with 2% Cl	Unbeaten
	46B-9-H	105	Hypochlorite bleached with 2% Cl	Unbeaten
Pine sulphate	43S-637-L	30-35	Unbleached	Unbeaten
	43S-637-H	105	Unbleached	Unbeaten
	45B-50-A-L	30-35	Chlorinated with 3.5% Cl; not neutralized	Unbeaten
	45B-50-A-H	105	Chlorinated with 3.5% Cl; not neutralized	Unbeaten
	45B-50-C-L	30-35	Chlorinated with 3.5% Cl; neutralized	Unbeaten
	46B-8-L	30-35	Hypochlorite bleached with 4.5% Cl	Unbeaten
	46B-8-H	105	Hypochlorite bleached with 4.5% Cl	Unbeaten
	46B-8-AEB	Room temp.	Hypochlorite bleached with 4.5% Cl	Unbeaten
	43S-637-b-L	30-35	Unbleached	Beaten
	43S-637-b-H	105	Unbleached	Beaten
Eucalypt sulphate (A)	45C-29-L	30-35	Unbleached	Unbeaten
	45C-29-H	105	Unbleached	Unbeaten
	45B-47-A-L	30-35	Chlorinated with 2.5% Cl; not neutralized	Unbeaten
	45B-47-A-H	105	Chlorinated with 2.5% Cl; not neutralized	Unbeaten
	45B-47-B-L	30-35	Chlorinated with 2.5% Cl; neutralized	Unbeaten
	45B-47-B-H	105	Chlorinated with 2.5% Cl; neutralized	Unbeaten
	45B-47-B-AEB	Room temp.	Chlorinated with 2.5% Cl; neutralized	Unbeaten
	45C-29-b-L	30-35	Unbleached	Beaten
	45C-29-b-H	105	Unbleached	Beaten
Eucalypt sulphate (A) beaten	45B-45-L	30-35	Chlorinated with 3% Cl; not neutralized	Unbeaten [1]
	45B-45-H	105	Chlorinated with 3% Cl; not neutralized	Unbeaten [1]
Eucalypt sulphate (B)	45C-71-L	30-35	Unbleached	Unbeaten
	45C-71-H	105	Unbleached	Unbeaten
	45B-48-A-L	30-35	Chlorinated with 2% Cl; not neutralized	Unbeaten
	45B-48-A-H	105	Chlorinated with 2% Cl; not neutralized	Unbeaten
	45B-48-B-L	30-35	Chlorinated with 2% Cl; neutralized	Unbeaten
	45B-48-B-H	105	Chlorinated with 2% Cl; neutralized	Unbeaten
	45B-48-B-AEB	Room temp.	Chlorinated with 2% Cl; neutralized	Unbeaten
	45B-44-L	30-35	Hypochlorite bleached with 3% Cl	Unbeaten
	45B-44-H	105	Hypochlorite bleached with 3% Cl	Unbeaten
	45C-71-b-L	30-35	Unbleached	Beaten
	45C-71-b-H	105	Unbleached	Beaten
Eucalypt sulphate (B) beaten	45B-46-L	30-35	Chlorinated with 2.5% Cl; not neutralized	Unbeaten [1]
	45B-46-H	105	Chlorinated with 2.5% Cl; not neutralized	Unbeaten [1]
Bleached eucalypt sulphate	46S85-AEB	Room temp.	Bleached [2]	Unbeaten
	46S85-b3-AEB	Room temp.	Bleached [2]	Freeness 350 ml.
	46S85-b2-AEB	Room temp.	Bleached [2]	Freeness 250 ml.
	46S85-L	30-35	Bleached [2]	Unbeaten
	46S85-b3-L	30-35	Bleached [2]	Freeness 350 ml.
	46S85-b2-L	30-35	Bleached [2]	Freeness 250 ml.
	46S85-H	105	Bleached [2]	Unbeaten
	46S85-b3-H	105	Bleached [2]	Freeness 350 ml.
	46S85-b2-H	105	Bleached [2]	Freeness 250 ml.
Eucalypt sulphate (C)	45C-30-L	30-35	Unbleached	Unbeaten
	45C-30(+60)-L	30-35	Unbleached	Fraction retained on a 60-mesh screen
	45C-30-b-L	30-35	Unbleached	Beaten
	45C-30-b(+60)-L	30-35	Unbleached	Fraction retained on a 60-mesh screen
	45C-30-H	105	Unbleached	Unbeaten
	45C-30(+60)-H	105	Unbleached	Fraction retained on a 60-mesh screen
	45C-30-b-H	105	Unbleached	Beaten
	45C-30-(+60)-H	105	Unbleached	Fraction retained on a 60-mesh screen

[1] A beaten pulp was chlorinated and did not receive further beating.
[2] A fully bleached mill product was used and no additional bleaching was done in the laboratory.

Results

These are listed in Tables II, III, and IV below.

TABLE II.—SHOWING THE INFLUENCE OF DRYING ON HEMICELLULOSES, VISCOSITY, AND RESISTANT PENTOSANS

Series No.	Viscosity, poises	Total Pentosans, %	Total Removal, %	Pentosans in Residue, %	Pentosan Removal, %	Nonpentosan Removal, %	Resistant Pentosans, %
45S237-L	21.6	5.2	9.7	1.5	3.9	5.8	1.3
45S237-H	6.2	5.0	10.1	1.9	3.3	6.8	1.7
46B-5-L	16.2	5.4	11.3	1.9	3.7	7.6	1.7
46B-5-H	9.6	5.2	9.8	1.7	3.7	6.1	1.5
46B-6-L	20.8	5.3	9.8	1.8	3.7	6.1	1.6
46B-6-H	7.3	5.2	10.1	1.7	3.7	6.4	1.5
46B-9-L	12.3	5.1	10.8	1.7	3.6	7.2	1.5
46B-9-H	3.3	5.0	11.1	2.1	3.1	8.0	1.9
43S-637-L	5.5	9.1	11.1	2.7	6.7	4.4	2.4
43S-637-H	2.5	9.0	10.3	4.2	5.2	5.1	3.8
45B-50-A-L	1.3	10.8	14.6	2.9	8.3	6.3	2.5
45B-50-A-H	0.3	10.9	16.6	3.9	7.6	9.0	3.3
45B-50-C-L	5.0	11.1	13.7	3.0	8.5	5.2	2.6
46B-8-AEB	2.5	10.6	13.0	3.9	7.2	5.8	3.4
46B-8-L	1.9	10.2	13.0	3.6	7.1	5.9	3.1
46B-8-H	0.09	10.3	12.3	4.8	6.1	6.2	4.2
45C-29-L	29.9	20.0	17.3	4.6	16.1	1.2	3.9
45C-29-H	26.0	19.8	17.0	4.9	15.7	1.3	4.1
45B-47-A-L	3.2	20.0	15.3	6.9	14.2	1.1	5.8
45B-47-A-H	0.5	19.6	14.4	10.0	11.0	3.4	8.6
45B-47-B-AEB	5.0	19.6	16.6	5.1	15.3	1.3	4.3
45B-47-B-L	25.3	20.0	13.2	8.6	12.6	0.6	7.4
45B-47-B-H	13.3	19.9	12.1	9.0	12.0	0.1	7.9
45-C-71-L	61.6	18.8	18.3	4.7	15.0	3.3	3.8
45-C-71-H	52.7	19.1	17.7	4.6	15.3	2.4	3.8
45B-48-A-L	8.7	19.8	16.9	6.7	14.2	2.7	5.6
45B-48-A-H	1.5	20.3	15.8	8.7	12.9	2.9	7.4
45B-48-B-AEB	10.2	20.2	15.6	6.3	14.9	0.7	5.3
45B-48-B-L	38.5	20.4	15.1	6.9	14.6	0.5	5.8
45B-48-B-H	19.8	20.4	14.0	8.1	13.5	0.5	6.9
45B-44-L	17.3	20.0	14.4	7.1	13.9	0.5	6.1
45B-44-H	11.9	19.8	14.2	7.5	13.4	0.8	6.4
46S-85-AEB	1.0	20.0	19.7	5.3	15.7	4.0	4.3
46S-85-L	1.1	19.9	19.6	6.8	14.4	5.2	5.5
46S-85-H	0.75	19.4	21.0	7.0	13.9	7.1	5.5

TABLE III.—SHOWING THE INFLUENCE OF BEATING (AND DRYING) ON HEMICELLULOSES, VISCOSITY AND RESISTANT PENTOSANS

Series No.	Viscosity, poises	Total Pentosans, %	Total Removal, %	Pentosans in Residue, %	Pentosan Removal, %	Nonpentosan Removal, %	Resistant Pentosans, %
45S-237-L	21.6	5.2	8.7	1.5	3.9	5.8	1.3
45S-237-H	6.2	5.0	10.1	1.9	3.3	6.8	1.7
45S-237-b-L	19.6	4.8	8.7	1.3	3.6	5.1	1.2
45S-237-b-H	6.2	4.5	9.5	1.7	3.0	6.5	1.5
43S-637-L	5.5	9.1	11.1	2.7	6.7	4.4	2.4
43S-637-H	2.5	9.0	10.3	4.2	5.2	5.1	3.8
43S-637-b-L	5.5	10.7	11.7	4.0	7.1	4.6	3.6
43S-637-b-H	2.4	10.8	11.2	4.9	6.5	4.7	4.3
45-C-29-L	29.9	20.0	17.3	4.6	16.1	1.2	3.9
45-C-29-H	26.0	19.8	17.0	4.9	15.7	1.3	4.1
45-C-29-b-L	24.7	19.5	17.5	4.9	15.4	2.1	4.1
45-C-29-b-H	14.9	19.2	17.1	5.1	15.0	2.1	4.2
45B-45-L	1.8	18.5	15.1	6.7	12.8	2.3	5.7
45B-45-H	0.3	18.5	15.8	7.9	11.8	4.0	6.7
45C-71-L	61.6	18.8	18.3	4.7	15.0	3.3	3.8
45C-71-H	52.7	19.1	17.7	4.6	15.3	2.4	3.8
45C-71-b-L	47.0	18.4	17.2	4.9	14.3	2.9	4.1
45C-71-B-H	28.2	18.3	17.0	5.6	13.6	3.4	4.7
45B-46-L	1.3	18.5	15.4	7.3	12.3	3.1	6.2
45B-46-H	0.2	18.5	22.8	8.1	12.2	10.6	6.3
46S-85-AEB	1.1	20.0	19.7	5.3	15.7	4.0	4.3
46S-85-b3-AEB	0.9	20.3	19.5	5.2	16.1	3.4	4.2
46S-85-b2-AEB	0.8	19.0	20.8	5.5	14.6	6.2	4.4
46S-85-L	1.0	19.9	19.6	6.8	14.4	5.2	5.5
46S-85-b3-L	0.9	20.0	22.4	5.2	15.9	6.5	4.1
46S-85-b2-L	0.8	18.2	22.0	5.9	12.6	8.4	4.6
46S-85-H	0.75	19.4	21.0	7.0	13.9	7.1	5.5
46S-85-b3-H	0.6	19.9	21.5	6.2	15.0	6.5	4.9
46S-85-b2-H	0.7	17.6	21.5	6.1	12.8	8.7	4.8

TABLE IV.—SHOWING THE INFLUENCE OF FIBER-SORTING ON HEMICELLULOSES, VISCOSITY, AND RESISTANT PENTOSANS

Series No.	Viscosity, poises	Total Removal, %	Resistant Pentosans, %
45C-30-L	13.5	18.1	3.1
45C-30(+60)-L	19.4	17.3	3.6
45C-30-b-L	14.3	18.7	3.4
45C-30-b(+60)-L	20.0	17.8	3.6
45C-30-H	13.9	16.1	3.6
45C-30(+60)-H	13.5	15.2	3.8
45C-30-b-H	9.2	19.0	3.5
45C-30-b(+60)-H	13.3	18.0	3.9

or crystallization, or other factors, causing a lower accessibility of the fibers to the purifying solution. Reactivity studies may contribute to a better understanding of these phenomena, and measurements of the reactivity of different cellulosic fibers are now being done.

If the "nonpentosan removal" values are regarded essentially as the removal of a cellulose fraction from the pulp, and the solubility in cold alkali is dependent on the degree of polymerization, then it seems that heat drying depolymerizes preferentially this fraction. In most cases, as a result of drying at the higher temperature, the cellulose removal increased. Since the cellulose molecule contains readily oxidizable primary alcohol groups, during heat drying an oxidation may take place and the oxidized cellulose fraction would contribute to the higher solubility observed. It was also found that heat drying caused mostly a decrease in the removal of the pentosan fraction. This may be explained by a decreased swelling in cold alkali of the heat dried "amorphous" pentosans (hydrogels). It may be noted, however, that if the solubility of the cellulose fraction increases, this increase by itself causes an increase in the pentosan content of the residue. The general tendency observed with the pulps investigated was that on heat drying the removal of pentosans by 7% cold sodium hydroxide solution decreased and that of cellulose increased.

It should be mentioned that chemicals, particularly hydrochloric acid, arising from the chlorination of the pulps and not completely washed out from the fibers, may have contributed to a depolymerization and to surface changes during heat drying. The viscosity of the heat dried pulps, produced by chlorination, subsequent neutralization and washing, decreased much less on heat drying than that of the pulps which were produced by chlorination and washing, without neutralization. The relatively low viscosity of some of the pulps, prepared by dewatering by means of organic solvents, cannot be explained easily. It is possible that acid impurities in the reagents used may have contributed to these results.

(b) The Influence of Beating

The influence of beating can hardly be separated from that of drying.

It appears that some hemicellulosic materials are solubilised during beating in a Lampen mill. In some cases, the pentosan content of the beaten pulps was found to be lower than that of the unbeaten pulps. It can be expected that beaten pulps, when dewatered under mild conditions, may exhibit a great reactivity and thus a high pentosan content. Conversely, beaten fibers dried under drastic conditions may become less reactive, and the pentosan content determined by the standard method appears lower. The same applies to the removal of hemicellulosic materials by 7% cold alkali. Without going into an unnecessary repetition of the arguments set out in the previous paragraphs, the essential difference between the effects of drying and of beating may be formulated as: (1) on heat drying the active surface is reduced and this reduced surface decreases the accessibility of the fibers to the caustic soda solution; oxidative or hydrolytic degration brings about the opposite effect, increasing the solubility in cold alkali. (2) on beating, more surface is liberated and the increased surface favors a better peneration of the purifying solution to the interior of the fibers *(5)*. The beaten fibers on drying may suffer a great reversal and thus

a great reduction in accessibility to solutions; the degradation and oxidation during heat drying are enhanced, because the beaten fibers possess a larger active surface for reaction; some depolymerization or change in the native structure of fiber building elements may occur during beating and be enhanced by the subsequent drying, fostering an increased removal of hemicelluloses by alkali solutions. It may be said that the ultimate effect depends upon which of the opposing factors for the removal of hemicelluloses by cold alkali solutions predominates.

From the practical point of view, it may appear important that, by beating wood pulps and subjecting them to cold alkaline purification, the extent of pentosan removal can be increased. The resultant highly purified wood cellulose should then be dried under such conditions that a marked reversal in their active surface does not occur.

(c) The Influence of Fiber Sorting

The effect of mechanical fractionation of fibers on the removal of hemicelluloses by cold alkali received only relatively little attention. One hardwood sulphate (unbeaten and beaten) was fractionated and the properties of the coarse fraction (retained on a 60-mesh wire) and of the parent material have been investigated.

It was found that the viscosity of the coarse fraction was higher than that of the total fraction, both with the unbeaten and beaten samples studied. These observations were in agreement with those of other investigators *(6)*. It seems that, because of the higher viscosity of the coarse fraction, the solubility in cold alkali is lower and, in accordance with this, the resistant pentosan content is higher.

Summary

Because the removal of pentosan materials is one of the major problems in the production of purified wood cellulose fibers for cellulose derivatives, studies have been made of:

1. The significance of resistant pentosans in wood pulps and the existing views on their structure and association with cellulose;
2. The effect of certain chemical factors, such as the oxidation by hypochlorite and hydrolysis by acids of wood pulps, and of some properties conditioned by drying, beating and sorting of fibers affecting the surface characteristics, on the removal of hemicelluloses by 7% cold sodium hydroxide solution.

The quantity of resistant pentosans tolerated in purified wood cellulose varies considerably for different industrial cellulose derivatives.

The structure of resistant pentosans and the nature of their association with cellulose in fibers are interpreted differently by various authors.

According to the "Ester Linkage Theory," some of the pentosans are linked to cellulose in the form of an ester. The "Theory of Particular Structure of Fiber Building Elements" advances that the orientation of building units in the outer layer of the secondary cell wall is responsible for the difficulty of removing extensively pentosans from fibers. The "Theory of Mixed Chains" assumes that a small portion of pentose units is incorporated in the cellulose chains. According to the "Mixed Crystal Theory" some pentosan chains participate in the formation of the micelles. The "Theory of Cross Bridges" assumes the existence of linkages between some pentosan chains or between pentosan and cellulose chains (ether linkages), inherent in the fibers in the wood, or formed during alkaline pulping, or during drying of the pulps.

It was shown that the resistant pentosan content in wood pulps, i. e., the pentosans insoluble in 7% cold sodium hydroxide solution, can be decreased by bleaching (oxidation) with hypochlorite or by acid hydrolysis of the fibers. For the same solution viscosity in cuprammonium the bleached pulps contained a lower percentage of resistant pentosans than the hydrolyzed pulps. It is possible that hypochlorite oxidation removes lignin residues more extensively than acid hydrolysis, or breaks the postulated linkages between cellulose and pentosans, rendering the fibers more accessible to the purifying solution.

Drying at higher temperature of a great variety of unbleached, partially and fully bleached wood pulps increased the resistant pentosan content and the removal of nonpentosan materials in almost all instances. The heat drying brought about a degradation of the fibers, as measured by the solution viscosity in cuprammonium. In instances when the degradation was relatively great, the total hemicellulose removal increased, while in some instances, when the degradation was moderate, it remained almost unchanged.

Beating of the pulps in a Lampen mill reduced the resistant pentosan content, but this reduction may be reversed by drying at higher temperatures. Beating also caused a decrease in the viscosity in cuprammonium, but this may have been enhanced by a degradation during the subsequent drying of the beaten fibers.

The viscosity in cuprammonium and the resistant pentosan content of a coarse fraction (+ 60-mesh) of a bleached eucalypt sulphate pulp were found to be higher than those of the parent fibers. This was found with an unbeaten and a beaten pulp sample.

It is postulated that drying, beating, and sorting different wood pulp influence the surface as well as the chemical properties of the fibers. These factors influence the removal of hemicelluloses by cold alkali solutions. During heat drying, the active surface of the fibers is reduced, but concurrently a depolymerization and oxidation may also occur. On beating, the surface is increased due to swelling of fiber building elements, but, during the subsequent drying a reversal may occur. The reduced surface decreases the accessibility of the fibers to the caustic soda solution, while the depolymerization and oxidation increase the solubility in the purifying solution.

It is concluded that, due to the simultaneous action of opposing and supplementary factors, which influence the removal of hemicellulosic materials by 7% sodium hydroxide solution, the net results measured only indicate the predominating effect of one or more factors within rather narrow limits.

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